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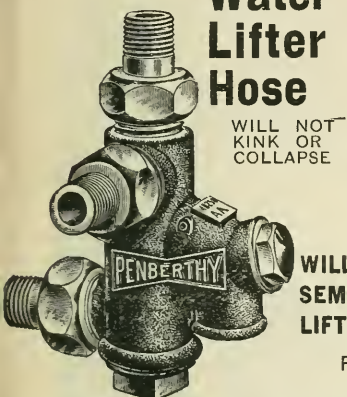
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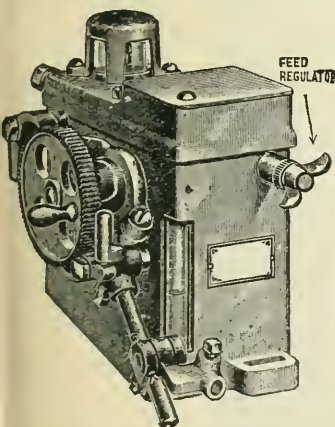
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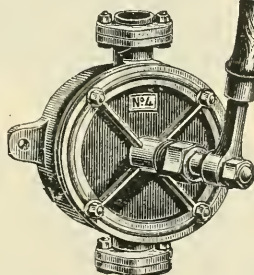
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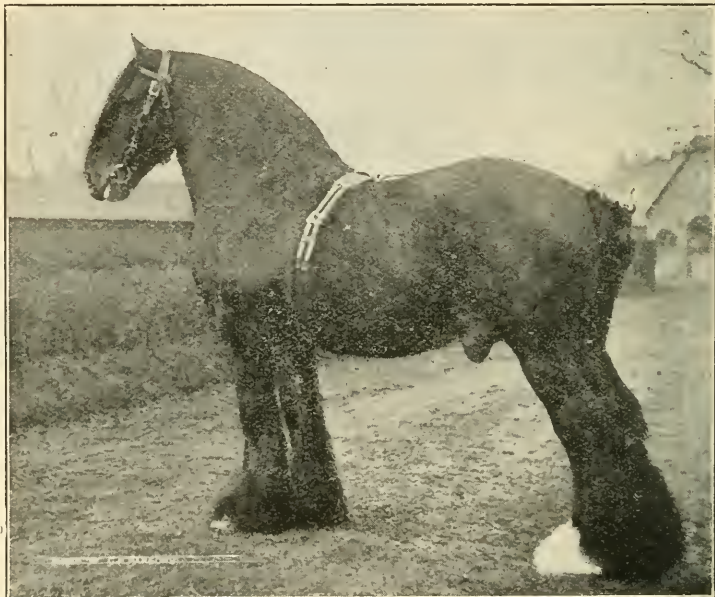


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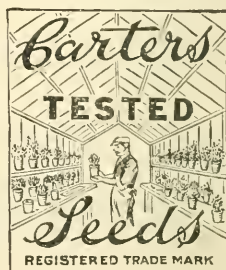
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THE VALUE OF SOIL ANALYSES TO THE FARMER.

SINCE the scientific man first turned his attention to agriculture, few questions have been more generally addressed to him than requests to make analyses of particular soils and report the cause of their excellences or defects. It would seem to be so straightforward a problem ; on soil A the wheat always stands up, on soil B it is apt to blight and go down ; why cannot the chemist analyse them both and say what valuable constituent B lacks, or what injurious substance it contains to so affect the wheat. The chemist, however, has rarely been able to answer such a question ; in many cases when he has given an answer it has not proved of any value in practice because, in all probability, he mistook some accidental variation between the two soils for a causal difference.

In the first place there is very little difference in composition between one crop and another, between a healthy and a diseased one ; all plants contain the same small range of elements drawn from the soil—nitrogen, phosphoric acid, sulphur, chlorine, soda, potash, lime, magnesia, with a trace of iron, and sometimes silica—and in very much the same proportions. These same elements occur in all soils with but small variations in the proportions. Few soils contain as much as 0·5 per cent. or less than 0·1 per cent. of nitrogen, and other important elements vary even less. Moreover, small as these amounts may seem, they are far more than the crop requires ; the soil over an acre down to the depth of nine inches weighs about 1,000 tons, so 0·1 per cent. would mean about 10 tons of nitrogen to the acre. Now a big crop of wheat would not remove from the soil more than about 70 lb. of nitrogen per acre ; mangels might take away twice as much, but still a trifling amount compared with the stock in the soil. Yet with all this

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stock the addition of another 25 lb., such as would be contained in 2 cwt. of nitrate of soda, may increase the crop by 20 per cent. or more.

Facts of this kind led the chemists to attempt to draw a distinction between the plant food in the soil that was available, *i.e.*, could be taken up by the plant, and the dormant stock which needed to undergo some chemical change to reach the form that could be utilised by the plant. Moreover, they began to attack the soil with certain very weak acids in the hope of extracting thereby only the available but not the total plant food which was present in the soil. The method thus introduced, though it did give additional information about the capacity of the soil to bear particular crops, by no means removed all the difficulties; a large excess even of available plant food was revealed in most soils, and the standard that had to be attained to ensure fertility was found to vary with both the crop and the character of the soil; *e.g.* a sandy soil with 0.01 per cent. of so-called available phosphoric acid might grow turnips perfectly well, whereas a clay soil with the same percentage would need some superphosphate or other phosphatic manure to ensure a reasonable yield.

Many attempts were made to obtain a precise distinction between the available and dormant plant food, but without any general measure of success, so much so that there has arisen in America a school of soil investigators who deny that the amount of plant food in the soil as revealed by analysis influences its fertility. The argument of Whitney and Cameron is that the water in the soil from which the plant draws its nutrition can only attain a certain degree of concentration in phosphoric acid and potash by contact with the soil minerals containing these elements, just as water can only take up a certain percentage of salt. Moreover, such a saturated soil solution must possess practically the same composition for all soils because they all contain the same minerals. For example, water in contact with a soil containing phosphate of lime will attain the same concentration in phosphoric acid whether there is one or ten parts per thousand of phosphate of lime in the soil. It would follow as a consequence from this view not only that a chemical analysis of the soil is a matter of no importance towards forming an opinion as to its fertility, but that the plant itself is equally indifferent to the amount of plant food it has at command, its growth being determined by some other factors.

We need not here consider the various points of controversy that have arisen over these views of the American Bureau of Soils; the point worthy of notice is that they remind us, with perhaps exaggerated emphasis, of the other functions which the soil has to fulfil towards the plant. The soil not only

provides the plant with certain foodstuffs but also with water and air, and the character of these supplies goes more to determine the crop than anything else. For example, we all know of how little avail even the best manured land is in a drought ; it is then far more important that the land should have been well cultivated and properly managed, because upon these operations depends the success with which the plant will obtain whatever water is available. Again, some soils are known to hold out against drought better than others, the difference cannot be a chemical one but must be due to some inequality in their capacity to retain water falling as rain or to lift that which lies in the sub-soil below. If, again, we consider the wheat crop of the past season, it was very noticeable that after the excessive rainfall of the previous winter there were on most soils patches where the wheat was stunted and of a bad colour, patches which never afterwards caught up with the rest of the field. These patches in nearly all cases owed their existence to some interference with the air supply in the soil ; either from its close texture or lack of drainage the soil below these spots for some little time became saturated with water to the exclusion of air, whereupon followed the death of the roots and the destruction of some of the most valuable elements of plant food.

Now one way of looking at a soil whereby some estimate may be formed of its behaviour towards water and air is to submit it to a mechanical analysis which will grade it into groups of particles of particular sizes. From this point of view all soils are mixtures of little particles—some large like sand, which, whether coarse or fine, possess no coherence but fall into a loose powder when dry ; some much finer, so as to be scarcely gritty between the fingers ; and some so fine that they will hang in water like a cloud for many hours, are quite soapy to the touch, and cohere firmly on drying. Coarse sand lies at one end of the scale, the finest pipe clays at the other, but it should be borne in mind that the coarsest sandy soil will always contain some fine sand, silt, and clay, while the purest natural clays are not free from sandy admixtures. Just as one could grade a gravel deposit into two inch, inch, half-inch and quarter-inch material, the process of mechanical analysis separates, partly by sieves but chiefly by settlement from water, the soil into fractions of known size, these fractions being arbitrarily selected but possessing certain characteristic, if not sharply defined, differences of behaviour.

The result of the mechanical analysis gives precision and reduces to figures the farmer's way of considering a soil. The farmer speaks of land as heavy or light, he may go further and define his soil as a loam, a sandy clay, &c., but the mechanical analysis reduces the relative proportions of sand and clay to

figures. Moreover, these figures are independent of the personal equation and of the climate, which so greatly affects the impression a soil gives; for example, soils that are described as heavy clays in Scotland, on analysis prove to be similar in all respects to others regarded as free working loams in the south of England. This difference in nomenclature is partly due to the climate which keeps the soil so much wetter in Scotland, where also no really heavy clays such as the London or Oxford clays exist for comparison. But though the mechanical analysis of a soil gives at once a good deal of information as to its behaviour under cultivation, it takes us little further than the chemical analysis towards the solution of the sort of problem indicated at the opening of this article—why a given soil does not answer for a particular crop and how can it be ameliorated. We have only defined one more factor in a very complex result, and even that factor can only be interpreted by comparative, and not by *a priori* methods. In other words, we cannot say that a soil with a given composition and structure must behave in such a way, we can only say that one soil resembles in such characteristics as we determine another soil whose properties in practice have been found to be so and so.

The next step in the study of soils is to accumulate a very large number of analyses of soils whose behaviour in practice is well known, and set down against the analyses that sort of intimate personal knowledge of the character of the soil in wet or dry weather, and the precautions necessary to get a good seed bed on it, &c., which is the special property of an old ploughman who has long worked on the land in question.

As soon as such a large body of soil analysis data are examined, certain general conclusions can be drawn which bring us a little nearer our prime object—that of being able to give the working farmer information of value. In the first place we find that by the similarity of their mechanical analysis we can group together all the soils which we otherwise know to belong to the same type. For example, in dealing with the soil of the south-east of England, the brick earths, whether occurring by the mouth of the Thames, in the Stour Valley in Kent, or on the maritime plain of West Sussex, all show the same distinctive structure containing about 12 per cent. of clay, little or no coarse sand, and about 25 per cent. of fine sand, so that we are justified in claiming that these soils of similar origin constitute a “type.” Now the chemical analysis of these same soils neither distinguishes them from others, nor brings them into one characteristic group; in composition they differ as much among themselves as they differ from other soils of entirely unrelated origin. For example, in nine cases the average percentage of phosphoric acid was 0.16 per cent., but in one

example there was as much as 0.284 per cent., in another as little as 0.074 per cent. In the soils from the Upper Greensand, which are entirely distinct, we find very much the same range of variation, 0.086 per cent. in the lowest case, 0.267 in the highest. Our mechanical analysis, then, affords us a method of classification which will bring the soils into natural groups, and this the chemical analysis fails to do, though it will supplement and sometimes check the grouping based upon mechanical analysis.

If next we compare the mechanical analysis of soils which are used for the same purpose, though they may be in different localities and of various origin, they again fall into natural types of similar structure. To take an actual example from the south-eastern counties, among the analyses were those of a number of soils in different places on which fruit was grown successfully, others were known to be specially appropriate to potato or barley growing. On comparing these results, it was found that all the fruit soils, though of various origin, fell within the limits of a fairly defined type; the potato soils again constituted another somewhat different type, as also did the barley soils. Thus, we learn that the adaptability of a soil to a particular crop is determined in the first place by its physical structure as revealed by the process of mechanical analysis. Further, by correlating from a large number of cases the mechanical composition and the crops which are known to answer on the soils, we may thus work out a specification, as it were, of a wheat soil, a barley soil, soil suitable for fruit or hops, &c., and this specification is not a theoretical conclusion, but simply a generalisation from actual experience.

Of course, the mechanical analysis does not sum up all the factors, we have also to take into account the rainfall, situation, and other climatic considerations. For example, soils of a particular type which grow first-rate barley in East Kent nearly at sea level and with a rainfall of little more than 20 inches, were found to be rarely cropped with barley in West Sussex, where the elevation is greater, and the rainfall over 30 inches per annum.

We have now arrived at a position in which the soil analyst can be of direct service to the farmer; he can tell him with some degree of confidence whether a particular crop can be extended into a new district on soils hitherto untried. The question does not of course arise with ordinary mixed farming, because about that the enquirer can always learn what has been done before on the land; but suppose the occupier desires to grow strawberries, or hops, or tobacco—some expensive crop new to the locality—then the soil analyst can tell him to what extent his soil agrees with other soils on

which the crop has been successfully grown, and in many such cases can warn him off an unprofitable venture. In doing this he is, however, as we said before, only giving precision to the opinions of a practical man, who, for example, after walking about on the land, digging a hole and feeling the soil, would readily express an opinion whether it were fit for fruit growing or potatoes. Sound as the judgment due to long experience generally is, it may be vitiated by some accidental circumstance. I have known a field reported as unfit to carry fruit merely because it was examined after a spell of wet weather and the drains were out of order. A mechanical analysis revealed the fact that the actual soil was little more than a strong loam of excellent texture for fruit if only the drainage was set right. At the time it was examined it was soaking wet because it was waterlogged, not because it was naturally heavy.

Before mechanical analysis can be made to yield its maximum of information a large number of analyses must be accumulated of soils whose behaviour is known under the various conditions of climate prevailing in the United Kingdom. With more experience of this kind investigators in different districts will then be able to work out correlations between mechanical analysis and the special features which mark the working of certain soils ; for example, why some soils run and pan so badly, why others should be cultivated but not ploughed in the spring, why the corn on yet others lodges so easily. Fortunately a considerable mass of data are being put together ; Dr. Russell and I have dealt with some 150 soils in Kent, Surrey, and Sussex ; Dr. Luxmoore and Professor Percival reported on a number of soils in Dorset ; while other systematic surveys are in course of publication for Shropshire and Norfolk, and are being carried out in other counties, so that in a very few years we shall possess this fundamental comparative basis for the soils of England.

We cannot, however, entirely dispense with chemical analysis ; at times it reveals certain facts of very great importance to the productivity of the land. First of all a chemical analysis will indicate whether the land is properly supplied with carbonate of lime, and whether it is neutral or acid. The importance of lime and chalk was thoroughly realised by the early farmers of Great Britain, but for the last half century their application has been neglected and in many parts of the country the occupiers of the land are living upon and exhausting the capital which their predecessors put into the soil. It is not merely compounds containing lime, like bones or superphosphate, that are necessary, but quicklime or carbonate of lime that will provide a base to neutralise the acids which are

always arising from the decay of vegetable matter. Heavy land needs carbonate of lime to keep the clay granular and enable the soil to crumble, to drain and dry, and so get warm; light land loses its carbonate of lime most quickly by washing and readily gets acid. As soon as the soil passes the neutral point a great disturbance sets in among the bacteria and other small organisms which have to prepare the food for plants, certain valuable forms are discouraged and may die out, those for example which fix nitrogen and those which cause nitrification. In their place micro-fungi can flourish, some of which cause disease, as for example the fungus of finger and toe, which cannot persist in a soil kept neutral by the presence of carbonate of lime. It is not too much to say that only soils containing a sufficiency of carbonate of lime can be really fertile or can make full use of the manure with which they may be supplied. We now possess methods of analysis which will measure the very small amounts of carbonate of lime present in many soils, and again we are able to form better estimates of soil acidity or otherwise than can be obtained from the simple but misleading litmus paper.

From these facts alone the soil analyst is in a position to give certain advice to the farmer; he can tell him whether to lime or not, whether to use nitrate of soda or sulphate of ammonia when he wants a quick acting nitrogenous fertiliser, whether for his turnips superphosphate or basic slag should be chosen or some neutral body like phosphatic guano or steamed bone flour. Manures are themselves acid or basic in their action on the soil, and they should be selected so as to neutralise and not to intensify its natural condition. As an example of the ease with which we may be deceived, on the black Fen soils superphosphate is the most valuable of all manures, yet it is most dangerous to use it on other black soils of a peaty nature; the Fen peat is neutral even alkaline, and neutralises the acid of the superphosphate; bog and moorland peats are acid. As to the other constituents, the analyst can sometimes provide valuable information with regard to the special need of the soil for phosphates and more rarely for potash. But this generally necessitates some previous knowledge of the type of soil, for it is not so much the absolute amount of either constituent that is significant as the amount relative to that which usually prevails in soils belonging to that group. For example, to find 0.16 per cent. of phosphoric acid in a given soil tells nothing, but to find such a result in a Thanet Sand soil would mean that the soil is well provided and needs no special phosphatic manuring, whereas such a figure from a Chalk soil would generally signify deficiency in phosphoric acid. Again we see the necessity of soil surveys by which the general type of our

soils can be established, if the results of a particular analysis are to be interpreted for the service of the farmer. To say a place is 200 feet above sea level tells nothing as to whether it is situated in a valley or on a hill unless the general level of the surrounding country is also known.

Another line of attack has recently been attempted ; the soil can be put under standard conditions of moisture and warmth in the laboratory, and the rate determined at which it undergoes chemical change by reason of the bacteria it contains. The fertility of a soil largely depends upon the rapidity with which its organic matter is decomposed by bacteria and its nitrogen compounds transformed into soluble ammonia and nitrates, the forms taken up by plants. Various methods for doing this have been worked out ; the carbon dioxide produced may be determined as a measure of total bacterial activity, or the rate at which ammonia and nitrates are formed from day to day may be ascertained. These methods certainly discriminate between fertile and poor soils, but they do not as yet throw any light on the causes of the differences revealed, and they have to be applied to a large number of known soils before their value in forming an opinion on an unknown soil can be assessed.

There still remains the difficult cases of abnormal soils which behave entirely differently from their neighbours, generally worse in the cases submitted to the analyst. Sometimes the solution is simple, as for example in several cases in my own experience, where the bad field is one that has never been limed or has escaped the chalkings by which the surrounding fields have been made fit for arable cultivation at some date so remote that all remembrance of the treatment has been forgotten. But more commonly the factor involved is one that eludes our still imperfect methods of analysis. For example, in Romney Marsh one may find fields side by side that have both been in grass from time immemorial, but one will fatten six to eight sheep to the acre during the summer, whereas the other, however lightly stocked, will only keep its occupants growing. Dr. Russell and I spent much time over this problem, dealing with three distinct pairs of such soils differing widely from one another in type. But the good soil always resembled the bad soil alongside, in both physical and chemical constitution. Continuous observations of the amount of water in the soil, the distance to underground water, which was close to the surface, the temperature, and other factors failed to reveal any significant differences. The good soil certainly was more active than the bad one, producing nitrates and ammonia more rapidly, and there were certain small constant differences between the two soils, but we were unable to detect the causal

factor with certainty, or to lay down any course of treatment which would bring the bad soil into the condition of the good one. Greater knowledge and more delicate methods of analysis are needed ; we must accumulate information as to the nature and composition of known soils before we can hope to attack the difficulties presented by these abnormal soils (and they turn up everywhere) with success.

In conclusion, we may summarise the present position of soil analysis as follows :—

1. Mechanical analysis enables us to classify soils and assign an unknown example to its type.

2. From the type, combined with knowledge of the situation and climate, we may predict its suitability or otherwise for particular crops.

3. Chemical analysis will tell us whether a soil is getting acid or needs liming to make it work properly and utilise the manure supplied to it.

4. From chemical analysis we can settle what class of manures ought to be used—whether sulphate of ammonia or nitrate of soda, superphosphate or basic slag.

5. Chemical analysis will often reveal particular deficiencies and the specific for phosphates or potash, but to do this with any certainty the composition and behaviour of soils of that type should be known from a previous soil survey.

A. D. HALL.

The Development Commission.

MILK RECORDS.

THE keeping of milk records, the pecuniary and other advantages derived therefrom, to say nothing of the knowledge both in breeding and feeding acquired by breeders of dairy cattle who have followed them up systematically, have been so much discussed both in the press and elsewhere during the past few years that it would almost appear to be a work of supererogation to attempt to write anything new on the subject ; but as the Board of Agriculture is now prepared to assist “ milk recording ” with a grant from the Development Funds, provided that the work is carried out on right lines and is approved by the Department, it has been thought that an article on the subject might not be out of place in the Society’s Journal.

That milk recording has not been taken up generally by the English dairy farmers is a matter of common knowledge, and this may be accounted for, in the first place, by the

reluctance usually shown by them to make any changes in their ordinary routine of work.

Other and more definite objections have been given to me from time to time by working farmers, of which the following are the most cogent :—

(a) That the time lost daily in weighing and recording the individual weight of milk is considerable, particularly in those cases where an early delivery of such milk is necessary, and to this must be added the time subsequently taken in entering the returns into the permanent record book.

(b) That the ordinary cowman cannot be relied upon to weigh and record the milk accurately, while it is impossible for the owners always to be present in the cowsheds during milking time.

(c) That in many cases, where an animal is inclined to put on flesh, it would be useless to trouble about the milk she gives, as she is milked until dry, and then sold to the butcher.

(d) That farmers do not want to have outsiders coming to their farm to do work which can be done equally well by themselves—an inspector of any sort being “an abomination” to the farmer in England.

Over and above these reasons must be added a latent fear that the milk records might show that the cows were not so good as their owners believed them to be, and this, coupled with the expenses which necessarily would be incurred if the work was carried out by a society, is, in my opinion, the real explanation for the apparent indifference shown by dairy farmers to the keeping of milk records.

It is not necessary to describe the utensils wanted for weighing and testing milk, as full descriptions and instructions for practical use are given in the catalogues of the various dairy implement makers. The milk of every cow in a herd should be weighed both morning and evening, either daily or weekly, the weight of milk being written down at the time on the card or slate in the cowshed, and subsequently transferred into the permanent record book. When samples are wanted for analysis they should be taken directly after the milk has been weighed. To get an accurate sample, the milk should be poured at least twice backwards and forwards from one bucket into another, before the quantity required is taken out. Milk for analysis should be put into a specially numbered bottle, and before being tested by the Gerber process should be heated up to 101° F., otherwise a correct reading may not be obtained.

Whether milk should be weighed daily or weekly is a question on which there is a difference of opinion, some insisting that daily weighing is necessary to get at the correct actual yield of milk; others contend that weekly

weighings are quite near enough for all practical purposes to arrive at a fair average figure. Before discussing this, it will be as well to review the practice and methods adopted in various countries, as from them a solution of the question may be arrived at.

England.—In England milk records, giving the quantity of milk by measure, have been kept by a few breeders for over half a century, but apparently the first published records were those of the breeders of Channel Island cattle, who wished to demonstrate the dairy qualities of their cows, such animals in those days being regarded only as ornamental.

In the late Mr. George Simpson's herd, at Wray Park, Reigate, records were kept as far back as 1876, the milk yield of one cow, *Luna*, for the years 1876 and 1877 being specially mentioned as remarkable in the introduction to the first volume of the English Jersey Herd Book.

In 1880 milk records of the Jerseys in the herd of the then Lord Braybrooke, at Audley End, were started, and elaborate tables giving the result of the milk yield for three years were published in the third volume of the Society's Herd Book.

Other breeders of Jerseys followed suit, and one in particular—the late Mr. John Frederick Hall, of Sharcombe, Wells—was so impressed with the good resulting from the keeping of milk records that he instituted the butter-test trials, which are still found in the schedules of the leading Shows both in this country and in America.

By degrees the practice of weighing and recording milk came into favour, and now breeders of pedigree cattle, notably Shorthorns, Lincoln Red Shorthorns, Ayrshires, and Red Polls, publish annually, either in their respective herd books or elsewhere, the milk records of the animals in their herds. These figures are always accepted as genuine, and when printed in a sale catalogue have of late years materially affected the results. As an illustration, reference may be made to the prices obtained at the sale of the late Mr. George Taylor's herd, where the milk records were printed under the pedigree of each animal.

Friesland.—Professor Fleischmann, in Friesland, appears to have been the first on the continent of Europe to carry out complete tests with a view to ascertain the differences both in the quantity and quality of the milks yielded by a herd of cows. He began this work in 1889, and as a result of his researches the "Friesland Agricultural Association commenced in 1894 a systematic investigation of the milk and butter yield of the cows of two herds on different sorts of soils, in order to draw the attention of the dairy farmer to the great differences in yielding power of cows of the same age and under equal

circumstances of feeding and treatment."¹ The milks in these trials were weighed and sampled three times in the month, morning and evening milk being taken separately, and so much interest was raised by the publication of the figures that "control societies" were started, and are now thoroughly established. The cost of a society of fourteen or fifteen members is estimated at 50*l.* per annum, but apparently in Friesland no subsidy is obtained from the Government.

"The percentage of fat in the milk" and "the influence of the sire on the productiveness of his female offspring" are the points specially brought into prominence by the figures shown in the various societies' records.

Denmark.—Denmark seems to have been the first country to obtain grants from the State for the keeping of milk records. "Control unions" were started in 1895, whose object "was to strike a balance sheet for each individual cow for guidance in feeding, for weeding out cows, and for help in selecting cows from which to breed."² To carry out the work, a paid assistant once in every fourteen or twenty days measured and sampled the milks of the various herds in the particular union or society, weighed and kept an account of the food given to each animal, made tests of the cows, their dates of calving, &c., &c., "for the purpose of drawing up a family herd book at each farm";² whilst a Government grant up to 14*l.* per annum, given to each union, reduced the cost to the members to a sum from one to two shillings per cow per annum.

The Association of Cattle Breeders, which had been started some years previously to improve the quality of the cattle by the use of selected bulls, worked so well with the "control unions" that the average yield of butter from the control union cows in a comparatively short time exceeded by 33½ per cent. the yield of the ordinary cow of the country.

Germany.—Milk control societies on the same lines as those in Denmark have been in existence in Germany for some few years. They have been worked with the dual object of furthering the breed of cattle, and using the milk yields "as a basis on which an improved breed of cows can be built up."³

Ayrshire.—Breeders of Ayrshire cattle commenced keeping milk records in 1903. Small societies were formed on the Danish lines, and with grants from the Highland Agricultural Society, the Ayrshire Cattle Herd Book Society, and lately

¹ "Milk Records," by J. Mesdag. *Journal of the British Dairy Farmers' Association*. Vol. XXVI., 1912.

² "The Danish System of Cattle Breeding." P. A. Mörkeberg. *Journal of the Board of Agriculture*. March, 1910.

³ "Milk Tests and Milk Control Societies in Germany." *Journal of the Board of Agriculture*. October, 1909.

with help from the Development Fund, the work accomplished has more than justified its inception which was mainly due to the efforts and hard work of the late Mr. John Speir.

Each small society consists of "twelve or any other number of owners of herds,"¹ so that apparently the interval between the visits of the inspector varies from seven to fourteen days, dependent entirely on the number of herds under his control. That official takes the weights of milk of two milkings, morning and evening, obtains the percentage of fat by the Gerber test, fills up the particulars of each cow on a special sheet in duplicate, and at the end of each period of lactation sends in a summary of the yield of each cow to the Secretary of the Milk Record Committee. It should be noted that the "farmer has to fill in the pedigree and particulars of each cow, including the registered number when in herd book"—which looks as if registration in the herd book is not obligatory.

In order, however, to keep up the typical standard of the breed, "the Ayrshire Agricultural Association, the Glasgow Agricultural Society, and the Fenwick Farmers' Society give prizes for cows which, according to the milk records, have yielded from 600 to 1,200 gallons in one year."

Canada.—In the month of "December, 1905, a committee of breeders representing several dairy cattle record associations" appealed to the Minister of Agriculture "urging him to undertake the supervision of yearly tests of cows of various breeds."² This was granted, rules and regulations were drawn up, and in 1908 some sixty cow testing associations had been formed. In these societies the records are under Government supervision, and the names, pedigrees, and performances of those cows who reach the necessary standard are published. The rules governing the Record of Performance are in effect as follows:—

All tests are for a period not exceeding 365 days.

Animals must be registered in their respective herd books.

Cows from two to three years old are classed as two years old; those from three to four as three years old; four to five as four years old; five years and upwards as mature cows.

In the four year old and mature classes "no cow will be accepted for entry if the beginning of her previous lactation period is more than fifteen months before the commencement of the test."

¹ "The Use of Milk Records and How to Keep them." Mr. John Speir. *Journal of the British Dairy Farmers' Association*. Vol. XXIV. 1910.

² "The Canadian Record of Performance for pure bred Dairy Cattle."—Report No. 1. July, 1908.

Every cow must drop a calf within fifteen months after the beginning of her testing period, and "no milk from a second freshening within the 365 days is considered."

At the end of each month the owner has to make out and report—

- (a) "A record of the weights of each milking with the total yields of each cow for the month."
- (b) "An approximate statement of the amount and kinds of feed given, and data concerning stabling and care given to the animals."

At the close of the year the owner must send in "a compiled report of the year's milk record taken from the monthly reports, and sworn to before a Notary Public or Justice of the Peace."

An Inspector visits the herd at least eight times during the year at irregular intervals, and unannounced; he remains at least two full days on the farm, weighs and samples the milk, records date of calving, &c., notes statement of feeding, and of sickness or any other disturbing influence, and sends a report to the Live Stock Commissioner at Ottawa.

The Standards for Registration are as below :

| Age of Cows | Ayrshire | | French Canadian | | Guernsey | | Holstein Friesian | | Jersey | |
|-----------------|----------|---------------|--------------------|---------------|----------|---------------|----------------------|---------------|----------|---------------|
| | Milk | Butter fat | Milk | Butter fat | Milk | Butter fat | Milk | Butter fat | Milk | Butter fat |
| 2 years old ... | lb. 5500 | lb. 198 | lb. 4400 | lb. 198 | lb. 5000 | lb. 200 | lb. 7500 | lb. 255 | lb. 5500 | lb. 218 |
| 3 " " ... | 6500 | 234 | 5200 | 234 | 6000 | 240 | 8500 | 289 | 6500 | 257 |
| 4 " " ... | 7500 | 270 | 6000 | 270 | 7000 | 280 | 9500 | 323 | 7500 | 297 |
| Mature ... | 8500 | 306 | 6800 | 306 | 8000 | 320 | 10500 | 357 | 8500 | 337 |

"Applications for the test must be made to the Secretary of the Canadian Association for the breed to which the animal belongs and accepted by him as eligible."

Australia.—Milk recording in Australia is in its infancy, but in Victoria conditions have been drawn up "to govern the admission and the method of testing pure bred dairy cows by the Veterinary Branch of the Department of Agriculture."

In many points the conditions are similar to those in Canada; the cattle must be registered in their herd book, or pure stock register, and with few exceptions all animals in the herd must be tested. The period of lactation generally begins one week from date of calving, while the testing and recording is only to "occupy a period of nine calendar months." A Government Dairy Supervisor has to visit the farm for the purpose of checking records, and taking samples of milk for

testing, nine times during the official lactation period, and “not more than thirty days is to elapse between any two visits.” The milk is apparently to be weighed daily, and entered on a sheet which is to remain the property of the Department.

The standard is fixed on the calculated weight of butter fat as shown by analysis, standard cows being those whose yield of butter is as below :—

(a) Cows commencing their first lactation period, being under 3 years of age, 150 lb. butter fat.

(b) Cows commencing their first lactation period, being over three years of age, 200 lb. butter fat.

(c) Cows of any age commencing any lactation period other than the first, 200 lb. butter fat.

It is proposed to award Government certificates to standard cows, such certificate giving full particulars of the animal, her yield of milk, &c., and all standard cows will be marked on the inside of an ear with the Government tattoo mark and an identification number.

Ireland.—In Ireland the keeping of milk records and the improvement of dairy cattle through the selection and registration of cows are so closely interwoven that I make no apology for considering both schemes together. They are essentially practical, and run on right lines, although at the present time Scheme No. 20 for encouraging improvement in dairy cattle is under revision. On the question of milk records the Department suggest :—

(a) A time limit for lactation period of 45 weeks.

(b) The milk to be weighed once a week on a fixed day in each week.

(c) The taking and testing of samples of each cow's milk at regular intervals during the lactation period ; the testing to be either done on the farm, or by the staff of the local creamery, or by the inspector of a cow testing association where one is in existence. The cow testing association when formed permits any dairy farmer in the district served by such an association to become a member ; but on the condition that he enters all his cows.

The Department supplies the record sheets and monthly summary books ; these have to be kept by the secretary of the cow testing association, who certifies the records, and the other particulars necessary. The record sheets, monthly summary book and list of members, are open to inspection by the Department at any time.

The Department in addition keeps a register of dairy cattle. This up to the end of last year, 1912, was open to good cross-bred Shorthorns and pure bred dairy stock upon application by the owners, but “only good cows of a distinct and well defined

type were eligible." Inspection was a condition precedent to entry, and "general appearance" and "milk yield" had both to be taken into consideration before the cow could be accepted. At the present time, save in exceptional circumstances, application for inspection of cross bred cows for entry in the register of dairy cattle must be made through a cow testing association.

The owner of each registered cow has to comply with several conditions, the most important being that the cow must be put to a registered dairy bull, or pure bred bull of her own type, which bulls must be passed by the Department as eligible for a premium.

The female progeny of registered cows bred to approved bulls will be eligible for inspection when about two years old at a nominal fee.

Young bulls, where the conditions have been fully complied with, are also eligible for inspection with a view to provisional selection for premium under the Department's cattle breeding scheme, within the limits of age specified therein, and if selected will be entered in the register of dairy bulls.

Other conditions are also enforced, but enough has been quoted here to show the practical outcome of the excellent milk record, combined as it is, with the scheme for improving the dairy cattle in Ireland.¹

Daily or weekly weighings.—Returning to the question whether for the purpose of milk records the milks should be weighed daily or only once a week, there can be no doubt that to be absolutely accurate daily weighings should take place, but unless the time of the milkers is unimportant, and there is plenty of clerical assistance, weekly weighings will give all the information required, and will not make such an inroad on the hours of the working farmer.

The weighing of the milk and entering the weight on the slate or card in the cowshed cannot be done, where there are a large number of cows, under an average of two minutes per cow. Allowing eight cows to each milker, sixteen minutes would be taken from each man's time both morning and evening, or roughly half-an-hour in the day per man, which during haytime or harvest would be inconvenient, to say the least of it.

Experiments to get at the difference between daily and weekly weighings have been carried out at several places in England and abroad, and the results show that the amount calculated from weekly returns is "more often under the actual

¹ "Milk Records." Leaflet No. 15 : "Scheme for encouraging improvement in the Dairy Cattle of Ireland through the Selection and Registration of Cows, Scheme No. 20." Both published by the Department of Agriculture and Technical Instruction for Ireland.

quantity than above it, but it is so trifling that it is scarcely worth taking into account.”¹

My experience agrees with that of the late Mr. Speir, and for all practical purposes I am satisfied that weighing and recording the milk once a week on a fixed day is sufficiently accurate to be reliable, while sampling for testing purposes if done three or four times in the period of lactation, will give all requisite information where the sale of milk only is carried on. The practice and the elasticity of the rules of the various control societies would appear to confirm this view.

There is another advantage in weighing milk once a week which should not be lost sight of, and that is in the small number of books which will be required, and the comparatively easy way in which the record of a cow can be ascertained. A book can be so spaced that it will record the weights of milk from thirty cows for one month on a single page; while columns, for the actual weight of butter, where churned, or for the fat percentage and the calculated weights of butter, can also be arranged on the same page, room for other remarks being also reserved. In such a book the cows are entered by name in the first column, and when they calve they are placed at the bottom of the list, gradually arriving at the top as their period of lactation progresses. To get at the weight of milk given by each animal is an easy matter. The weekly weights are added together at the end of the lactation period and multiplied by seven, the total being placed in the space provided for “remarks” on the line allotted to the particular cow. The weight of milk given by the herd in a day is readily obtained by adding up the weekly column, but this is only mentioned to demonstrate how useful such a return may be to the farmer.

Twelve pages of a book so ruled will take the record of a herd of thirty cows for a year, twenty-four pages a herd of sixty, thus making it possible to keep in one book the records of ten to twelve years or more, while the performance of any individual cow can be seen at a glance, as no index is necessary, the names of the cows being given on every page.

A specimen page of such a book is given on pp. 18 and 19.

Fat percentage.—It will be noticed that in nearly every control society mentioned above, where a “standard yield” is fixed, the calculated pounds of butter fat rather than the actual weight of milk are taken as the basis, apparently because the manufacture of butter is the staple trade of the particular country. In England the case is different, as, save in exceptional circumstances, no one would think of making butter from the milk of our heavy milking breeds, so long as a market

¹ Mr. John Speir, *op. cit.*

[illegible]

is available for such milk. The quantity of milk, rather than its quality, should therefore be the aim of milk recording societies here. With the exception of Canada—where rather too long a period of lactation is permitted—the quantity of milk necessary to reach the standard in the other countries does not appear to be excessive.

The tendency of the milk yield trials—and probably that of every milk recording society—seems to be to encourage large yields of milk to the possible detriment (*a*) of the quality of the milk, and (*b*) of the particular animal.

Taking the quality of the milk first, it would almost seem necessary that in milk record societies a condition should be insisted upon requiring occasional sampling and testing for percentage of fat. To take samples and test milk correctly presupposes the presence of an Inspector, as the value of such test depends entirely on the way the sample is taken and subsequently manipulated; but, for the reason given above, sampling of milk in England two or three times during the period of lactation should be sufficient, as all that is needed is that the milk should show not less than 3 per cent. fat. Although for this purpose the testing of milk for fat by the Gerber process is quite sufficient, the fat percentage shown by this method should not be the basis from which the pounds of butter fat are calculated. This appears to be the practice in most countries, but in my opinion it is not reliable unless the sampling and testing are carried out by the same person, who ought to be an expert. Where it is desired to ascertain the true value of a cow's milk for butter production—even when the milk has been sampled by an expert—the butter should be obtained by the ordinary process of separating and churning, as a check on the calculated weight, as the milk of different breeds varies in many particulars. In some the cream rises very rapidly, while in others it takes a longer time, and for this reason alone, unless the greatest care is taken in getting a correct sample, it is quite possible for a mistake to be made. I have known three different readings obtained from three samples of milk, all drawn at the same time from the one bulk, immediately after the milk has been weighed.

Again, it is a matter of common knowledge that some milks do not churn as well as others, and that butter fat passes away in the buttermilk, this being accounted for by the difference in size of, and want of uniformity in, the fat globules. To assume, therefore, in every case that the calculated number of pounds of butter fat—plus an allowance for water—represents the butter that would be obtained from the same weight of milk by churning, is wrong.

Testing by the Gerber process, however, is useful in showing the percentage of fat in milk, and so enabling a farmer to satisfy himself that the milk he is sending out from his farm is up to the so-called Government standard of 3 per cent. fat—a standard which no one keeping a large herd of cows should be afraid of.

It is not necessary to refer here to the pecuniary benefits that follow the keeping of milk records, as the high price now being paid at sales and elsewhere for milking cows of any breed, even without pedigrees, that have their milk records published, is sufficient evidence of the fact; but I feel it necessary to call attention to certain drawbacks which, in my opinion, may attend the injudicious overdoing of this hobby.

To “make” or “break” a record seems nowadays to be a ruling passion, and milk records form no exception. There is a tendency amongst some breeders to sacrifice too much to quantity of milk, disregarding those other essentials which should be found in all dairy cattle.

Constitution.—A good constitution is an absolute necessity in a dairy cow. The strain on an animal giving a large quantity of milk is very great, and she is consequently much more prone to colds and ailments of various kinds than one which is only rearing her calf. Again, the young stock from very heavy milking cows require extra care and feeding, as they otherwise seem to thrive less well than do the offspring of moderate milking cows.

While not wishing to deprecate the breeding or exhibition of cows which give abnormal yields of milk, I am satisfied that the most profitable dairy cow in the long run is one that will give a fair quantity of milk, spread over a lactation period of from nine to ten months, and produce a strong healthy calf within the year. Such cows do not, as a rule, give more than from 400 to 500 gallons with their first calves, but they gradually increase as they get older until they reach from 800 to 1,000 gallons. A cow giving a moderate quantity of milk spread over a period of lactation of nine months is a more profitable animal in the long run than one giving an abnormal quantity for three months.

Type.—Another drawback to the keeping of milk records is that with some breeders the production of milk, and that alone, seems to be their highest ambition, apparently ignoring the question of type and the general appearance of their animals.

The continuous foreign demand for cattle from this country is to be traced to the patience and care taken by the breeders of pedigree stock for, in some cases, a hundred years or more, to improve and fix the type of their particular breeds. To sacrifice type to milk, therefore, must be wrong, and may prejudice the demand for English stock abroad, but on the

other hand any plan which has for its object the improvement of the milking qualities of our typical breeds should be supported by all breeders of cattle. It will be noticed that the Irish scheme for the improvement of dairy cattle couples "general appearance" with milk yields, and this combination should be the aim of all breeders of dairy cattle.

At the present time almost every breed of cattle in Great Britain has its herd book, into which every animal is eligible for entry, so long as its parents are both registered, no matter what faults it may have. In this way many inferior animals are entered in herd books, which ought to be left out. To prevent this, inspection before admission should be a condition precedent in all herd book societies, although few of them would now entertain such a proposal.

With milk recording societies, when associated with cattle registering societies, no such difficulty need occur. Registration is only in its infancy with them, and if they are to do really good work, "general appearance" equally with "milk yield" should be taken into account.

This is the practice in the island of Jersey—no heifer is admitted into the island herd book until she has produced a live calf, and been inspected by the herd book judges, who only accept those animals which are typical of the breed, have good dairy points, shapely udders, and well-placed teats. Bulls have to be shown with their dams before a number is given to them, and no matter how good looking a bull may be, if his dam is wanting he will not be accepted. The forward position that island-bred Jerseys take in the inspection classes at the leading shows in this country, is mainly attributable to this excellent system. It may be thought that too much is being made of this question of type. If the cattle competing in the milk yield and butter test classes at the shows here are compared with the corresponding exhibits in the inspection classes, the reasonableness of these remarks will, I feel sure, be admitted.

Inspection prizes such as are offered at the shows of the Royal Dublin and Royal Ulster Societies, open to those cattle whose milk records are sufficiently good to enable them to compete, would do much towards improving the "general appearance" of dairy cattle as they would demonstrate the necessity of combining "type" with "performance." There is only one drawback to these classes, and that is where cattle of different breeds have to compete against one another. As a rule, however, the Dairy Shorthorn (which after all is the cosmopolitan animal) is generally the most represented in such a class, and therefore to confine the entry to cows of the Shorthorn breed, or crosses with a Shorthorn, should not be objected to.

Milk record societies confined to pedigree stock of particular breeds should not require any assistance from the Development Fund, as the publication in their respective herd books of the yields of the cows, should be accepted as a guarantee of their being correct, just as the connection of the animal with the pedigree allotted to it is never questioned : but societies formed to register the yields of non-pedigree stock stand on a different footing, and if they are to succeed, they must have pecuniary help.

Dealers in unregistered stock are not too particular to verify the statements made to or by them, as to the cattle they sell, consequently there should be identification of all cows that have obtained milk record certificates, and this means an expenditure of money.

A society, if well organised, should be able to look after the milk records of from twenty to twenty-four herds with one inspector—or, preferably, secretary—as the bulk of his work would consist only in weighing and recording the weights of milk, and checking the entries of those weeks when he was not present. For the reasons given above, it would not be necessary for him to take samples and test for fat percentage more than three or four times in the year.

Such societies would require but few rules and conditions, and the simpler the better. Omitting such clauses as are necessary in all societies for regulating the duties of the committee, secretary, &c., the following suggestions for the carrying out of their practical work are given with diffidence.

RULES.

1. The milk of every cow in the herd to be recorded.
2. Milk to be weighed on one day in each week, and the weights of both morning and evening milks to be entered in the record book.
3. The day in the week for weighing the milk to be fixed by the society, and always adhered to.
4. The secretary to the society to make nine visits to each herd during the period of lactation of any animal at intervals of not more than 35 days.
5. The lactation period of all cows to extend for nine complete months, and no cow to be accepted for registration until she has milked during the whole of that period.
6. Samples of milk for analysis to be taken by the secretary at his discretion. Three or four such samples must be taken during the period of a cow's lactation, the first between the third and sixth week after calving.
7. The time limit for calving not to exceed 13 months.
8. Cows giving over 600 gallons of milk in the nine months to be eligible to compete for any inspection prize that may be offered for such cattle, the milk yields to be certified by the society's secretary.
9. No freshening of milk following abortion to be entered in the record book.

It is a comparatively easy matter to point out the good that follows the keeping of milk records, but it is very difficult to persuade a farmer to join or help in forming a society for the

purpose. Those who already weigh the cow's milk do not see the force of paying someone else to check their work, while, as mentioned above, those who do not keep records are chary of making a beginning.

The question of expense undoubtedly is a deterrent. The cost of a society consisting of from twenty to twenty-five members, including salary of secretary and all other outgoings, cannot be much less than from 100*l.* to 125*l.* per annum, or, in other words, 5*l.* per member. If a grant of two-fifths of this amount were made from the Development Fund the cost to the members would still be 3*l.* per herd. This sum a farmer might at first hesitate to put down, although after a year or two he would, I feel sure, be glad to do so. Where the herd consists of a large number of cows the cost could not be said to be excessive, but where there are only ten or a dozen cows on the farm it undoubtedly appears heavy. The question of charging *per capita* is difficult, because the expense of weighing the milk of a large herd is no more than that of a small one, as the secretary could in ordinary circumstances only undertake one herd in the day. Even where sampling and testing has to be done the only extra expense with a large herd would be the cost of material for the tests.

I have called special attention to this difficulty, because the question of cost is undoubtedly a stumbling block in the first instance. If two or three neighbouring farmers in various parts of the country could be persuaded to form small societies amongst themselves, undertaking occasionally to check each other's records, a beginning might be made. The milk need only be weighed one day in the week, and no sampling or testing should be attempted. If at the same time books to contain these weekly records could be provided free by the Board of Agriculture, as is done by the Irish Department, or at cost price, the uniformity of such records would be assured. A condition might be made in giving such books that they should be open to an inspector of the Board of Agriculture, or an officer of the County Council, at any time upon due notice, which would accustom the farmer to that inspection which at the present time he does not care for. Such voluntary societies as this would cost little or nothing, and I am satisfied that the resulting good would soon show itself, as my experience tells me that no one who has once taken the trouble to keep milk records will willingly abandon them.

I have said nothing as to the lessons and hints, both in breeding and feeding, that can be obtained from a study of milk records and a comparison of the individual performances with the particular animals in a herd, because I should be going beyond the scope of this article; but I know that far

more is to be learnt on both these subjects than people have any idea of. It seems certainly strange that while the farmers abroad and in our colonies, who depend on butter-making—a much less lucrative business than milk selling—appreciate the enormous benefits that have resulted from the establishment of milk recording and milk control societies, our farmers at home will not try a system which would certainly tend to increase their profits and at the same time improve their cattle ; but such is the way of the English farmer, and it will take even more than the promise of assistance from the Development Funds to make him see the importance of “waking up” and profiting by the establishment of milk recording and other kindred societies.

ERNEST MATHEWS.

Little Shardeloes,
Amersham.

WEST COUNTRY CHEESES.

1.—SINGLE AND DOUBLE GLOUCESTER CHEESE.

THOSE who remember the old cheese-making days in Gloucestershire, or recall the stories of still earlier periods which have come down to them, are apt to talk of it as a dying industry, and it must be admitted that the output of this variety no longer approaches, in any degree, that of former times.

Two causes are probably at work to account for this fact—the first, and more important, being the constantly growing demand for milk in all towns, and the comparative facilities for sending it long distances by rail.

The second reason, though less direct, is, no doubt, a contributing factor to a not inconsiderable extent. In these modern days we do not accept with the same amount of calmness and patience, as did our grandmothers, the necessity for close attention, which might almost be called drudgery, required in the dairy where cheese is made, “Sundays and week-days,” for six or eight months in the year. The women of our farming households have fallen back upon milk-selling as a convenient and ready means of escape from the more exacting work at the cheese tub. But when we are told that the quality has deteriorated, in conjunction with the falling off in quantity, we join issue with the detractors. Those who declare that the cheese of to-day cannot compare in flavour and richness with the Double Gloucester of fifty years ago are safe

in making their assertion, actual comparison being impossible ; but it may be supposed that there are makers of this variety still to be found whose finished product would probably be pronounced equally good, if not superior, by competent judges.

There are two distinct kinds of Gloucester cheese, the Single and the Double, differing considerably in size, quality, and method of manufacture.

The Single variety is a large, flat cheese, not more than about two to three inches deep, and weighing either six or eight cheeses to the cwt. that is some 14 lb. to 18 lb. each.

As regards quality, a very prevalent custom was to take off at any rate part of the cream from the night's milk, this being retained for butter-making, though some makers leave in all, or nearly all, of the cream, so obtaining a better weight and quality ; the two being termed respectively " best " and " market " cheese.

The method of manufacture is simple, only slight acidity being developed, and a comparatively low scald is employed of about 88° F. to 90° F., though occasionally some dairies scald to 92° F. or even 94° F., and encourage more acidity.

The usual type of curd when fit to vat is, however, soft and flaky, rather than tough or " leafy," and the acidity from the press of many good cheeses does not exceed 0·35 per cent., and may often be less.

The vats are thick, heavy wooden ones, with a diameter of about fifteen or sixteen inches, and a depth of some three inches. No followers are used, the curd being piled high in the centre of the vats, which are placed one upon the other in the press, the top one being covered with a board.

When the cheeses are turned the next day a certain amount of trimming the edges with a sharp knife will often be necessary, the curd so trimmed off being added to that of the current day's make, when it is milled.

The old custom, under which the curd was vatted practically sweet, was to salt the cheeses while in the press by thoroughly rubbing them all over with salt when they were turned, but the mixing of the salt with the curd before vatting is now more generally practised, the development of a certain amount of acidity before milling rendering this method of salting possible, and it is more convenient and less laborious. In the same way and from the same cause another old and undesirable plan has disappeared, namely, that of putting the wet curd from the tub roughly into the vats, and expelling the whey by squeezing it in the press, the curd being then returned to the tub again, broken up and re-vatted.

Considerable skill is necessary both in filling the vats to the right extent and also in turning and dry clothing the cheeses,

that they shall not be marked, or the edges damaged in the press, the cheese being soft and readily lending itself to injury at this stage.

Where care is taken, however, they come out finished very nicely, and after a few days in the cheese-room become firmer, and are more easily handled.

Single Gloucester is eaten comparatively new ; for household use they are often cut in about four or five weeks, while most of them are ready at the end of about two months ; though well made ones will keep for some time longer, but owing to the large surface exposed in proportion to their size they lose weight somewhat considerably.

The texture of the ripe cheese is open, rather than close, and the flavour is also quite distinct from that of the Double Gloucester. There is a general impression that Single Gloucester is especially suitable for cooking, and it is sometimes spoken of as "toasting" cheese. While some years ago the wholesale price was often quoted at about 50s. per cwt., and was occasionally even less, in these days, owing to the enhanced value of cheese, and partly perhaps to improved quality, they are worth considerably more.

The bulk of the output is made in the Berkeley district, and at the auction sale following the recent Berkeley Hunt Agricultural Show some of the best exhibits touched 80s. per cwt., though this was no doubt a fancy price.

The demand for it is chiefly local, and it is probably not a suitable cheese to find its way easily into a new market.

Double Gloucester had once a great reputation of its own, until a dwindling output accompanied its displacement by the ubiquitous Cheddar. Though still worthy of every consideration from the cheese eater, it is to-day made in such small quantities in the county of its origin that it has not its former opportunities of getting far afield.

In type this variety comes between the Single Gloucester and the Cheddar, approximating more in these days perhaps towards the latter. Broadly speaking, the maker aims at obtaining a curd which, though finer and drier in the whey than that of a Single, is, on the other hand, not so dry or "shotty" as a Cheddar at this stage. An acidity of about 0·16 when the whey is run off generally produces satisfactory results, and should 0·18 be exceeded the cheese will, as a rule, be too acid.

When fit for milling the curd should "draw" well on the hot iron, and the acidity of the whey from the press is about 0·8 to 0·9, though many good cheeses have a somewhat lower acidity. No caps or bandages are used, the cheese being

expected to coat very much as the Single does, and great care is necessary in turning them for the first week or two, to avoid damaging the edges, which are somewhat tender at first, the cheese being softer and less easy to handle than a Cheddar.

Owing to this fact which is no doubt due to extra moisture retained during the process of manufacture, the cheese does not always keep an absolutely upright shape, but often shows a slight bulging or roundness of the sides. For the same reason the weight of ripe cheese per gallon of milk is usually most satisfactory. The standard size for Double Gloucesters is a diameter of some fourteen inches, with a weight of about 28 lb., or "four to the cwt." in local parlance. To ensure this twenty-eight gallons of milk is put into each cheese, this being sometimes increased to twenty-nine or even thirty gallons at the beginning of the season when the milk is poor.

The finished cheese, ripe in from two to three months, is an excellent article, which improves with keeping. Cheese made in the autumn may be held over until the following spring or even later.

Those who taste the exhibits at the Royal Agricultural Society's Shows must form a somewhat erroneous idea of the quality of the best Double Gloucester owing to the newness of most of the cheese on the bench. It was suggested to me, not long since, by an old and experienced exhibitor of the variety, that as the Society's Show falls so early in the season it might be advisable to give prizes for cheese of the previous year's make, and, provided that sufficient notice of the proposed alteration was given, the idea has much to recommend it.

Gloucestershire cheese-makers do not, as a rule, commence operations until May, when the cows are out on the pastures.

The dairies are small, rarely exceeding about thirty cows, so that the output is at no time large, and of late years, as alluded to above, tends to decrease still further, with the growing popularity of milk-selling.

Still, it only needs a visit to the cheese-tent at the Show of the Berkeley Hunt Agricultural Society, where this year over five tons of Gloucester cheese were exhibited, to convince one that the cheese-making industry in the county is by no means dead. Competition is keen and local interest equally so, and there is no reason why, with a little more enterprise on the part of our dairy farmers, Double Gloucester, at any rate, should not regain and extend the position it once held with the consuming public.

FLORA M. PRIDAY, N.D.D.

County Council Dairy School,
Gloucester.

2.—CAERPHILLY CHEESE.

CAERPHILLY is a market town in the parish of Eglwysilan in the county of Glamorgan, 160 miles west of London; 7 north from Cardiff; 12 west of Newport, Monmouthshire; 49 from Bristol; 59 from Swansea; and 6 from Pontypridd. Seated in a valley, with a station on the Rhymney Railway, and surrounded with mountains, abounding in coal of good quality, and noted from time immemorial for its market for the sale of its most excellent cheese, it is a singular fact that so very little should be known of its early history and its stupendous fortress. The origin and name of the town and castle, and by which the castle is now known, is very obscure. Many attempts have been made to solve the question of the true etymology of the present name. Some conjecture it to proceed from one Filly, the son of a giant. Others say that it derives its name from F'filly, the son of Cenydd. Dr. Richards, of Lyme Regis, in his dictionary says that Caerfeli has become Caerphilly, and that it may have been built by Feli ab Dyfnwal Moelmud ab Clydo, or by Feli Mawr ab Manogen, who died B.C. 69, and left four sons—Lud (King Lud), Caswallon, Lefus and Ninio. Caswallon was king when Julius Cæsar landed in Britain.

ORIGIN OF CAERPHILLY CHEESE.

This cheese was originally sold weekly at Caerphilly, where a market for it has been in existence from a period beyond memory, and of which I can obtain no record. The cheese to which the town gives its name was made chiefly between the river Ebbw, in Monmouthshire, and the river Ely, in Glamorganshire, in an area containing about thirty parishes, in which would be found between five and six hundred small farms, upon each of which are kept from six to twelve cows. The cheeses weigh from five to ten pounds each, according to the number of cattle kept and the quantity of milk available, and are one of the principal products of these holdings.

It is still maintained—and I believe justly so—that, owing to climatic influence, combined with a suitable herbage and the formation of the soil, Caerphilly cheese—or cheese containing that agreeable flavour, easy to digest, with a thin wrinkled rind, moist, rich and palatable, but still retaining the valuable property of keeping if required—can only be produced in Monmouthshire, say west of the river Usk, and in that portion of Glamorganshire already indicated. Caerphilly cheese made in these districts is of the greatest value to consumers, who are chiefly those employed as operatives, or miners, in the great iron or coal industries of Monmouthshire and

South Wales, but more especially to the miner, to whom, and when in the pit, it is a digestive food that he can always eat and enjoy.

Since direct communication with Somersetshire from Monmouthshire and the mining districts in South Wales was accomplished by means of the Severn Tunnel, Cheddar cheese makers in Gloucestershire and Somersetshire, especially so in the latter county, have, during the last fifteen years, turned a considerable amount of attention to the manufacture of this cheese, so much so that during the last four or five years the average sale of West of England Caerphilly cheese sold in Newport market alone has been equal to 170 tons a year, five-sixths of which was made in Somerset. It must, however, be borne in mind that a proportion of this cheese is manufactured from the evening's milk skimmed, to which the unskimmed morning's milk is added. Cheese of this type commands the market at a remunerative price, from the fact that the large Somerset dairy farms can place a much larger number of cheeses from one day's make on the market than can the smaller holdings in Wales. Nevertheless, the West Country Caerphilly does not possess either the true flavour or the keeping qualities of the cheese made in the original home. A Caerphilly made in August or early in September, if carefully managed, will keep and improve till the following March or April, and in many instances turn out, both in colour and flavour, a fine example of an excellent blue veined cheese.

MANUFACTURE OF THE CHEESE.

In the manufacture of Caerphilly cheese the milk of one meal should be used. The rennet, of standard strength, is added to the milk when the milk is at a temperature of 86° F., and this is maintained as nearly as possible until the curd is taken out of the cheese tub. It takes one dram of rennet to coagulate three gallons of milk in one hour. The rennet, having been accurately measured, should be mixed with pure cold water to the extent of at least four times its volume; this insures a more perfect mixture in the milk. Home-made rennet is unsatisfactory; its strength is variable, and it frequently contains organic matter, which rapidly decomposes. Rennet of such excellent quality, both English and foreign, is now produced that its manufacture by the cheese-maker would be very unwise. The curd is ready to cut when it is firm enough to break over the finger without adhering to it. Cutting is accomplished usually with the American curd knives. Great care must be taken in the cutting, which must be done slowly and gently, so as not to bruise the curd, or

the result might be a white whey and loss of fat, which will reduce the quality of the cheese. It should be cut as evenly as possible into small cubes about the size of peas. (When the curd is not cut evenly, swelling or puffing in the cheese during the ripening process often results, for though the smaller pieces of curd have lost their whey the larger ones are still partially charged, which causes fermentation.) The curd is then stirred until it is fairly firm, which will take nearly one hour (the proper time the maker will soon ascertain by experience). It is then allowed to settle for a few minutes and the whey run off. The colour of the whey is an index to the success of the first process of cheese-making. It should be clear and of a greenish tint. If it is white, and there is any curd in it, it is an indication that the cheese has been robbed of a part of its most valuable constituent. The curd is then taken out of the tub into cheese cloths, tied up, and allowed to drain for an hour, when it is broken up with the hand, put into the vats, and allowed to stand again for two hours before being put into the press. Only a slight pressure is put on for the first two hours, when the cheese is taken out of vat, turned, and put back into the same wet cloth, carefully arranged to avoid creases, and then pressed heavily to 15 cwt. The next day the cheese is turned and salted on both sides twice; should the cheese be more than 10 lb. it will require more salt. 4 oz. of salt will be found sufficient for a cheese of 8 lb., or $\frac{1}{2}$ oz. to each pound of cheese. Half the quantity is rubbed on morning and evening of second day. The cheeses are pressed altogether for three days, using a clean dry cloth after first time of turning. The cloths should be put on straight so as not to mark the cheese and spoil its appearance for market. When taken out of the press they are put in the cheese room on a wooden table or shelf, and turned twice a day for the first week, and the turning should continue once a day until the cheese is disposed of. They are ready for sale from a fortnight to three weeks, but with proper management they will keep and improve for several months. The cheese room should be kept at a temperature of 65° to 70° F. A little draught is good, but not too much dry air, as this will certainly crack the cheese. All utensils and cloths used in the making of cheese ought to be washed in cold water first, to get rid of all the curds, and then with hot water. The production of good cheese depends first and foremost upon clean utensils, upon pure water, absolute freedom of the pastures from such strongly-flavoured herbs as garlic, &c. Suitable dairy equipment is also essential. However plain the dairy building may be, it should be dry and well ventilated and provided with a hard-faced floor, absolutely without drains or any kind of recess in which milk, whey, or

drainage water can lie (undisturbed). Pure milk will always acquire taint in an impure dairy. The produce of tainted milk is considerably less in quantity, as well as inferior in quality.

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3.—DORSET BLUE CHEESE.

DORSET Blue, or Blue Vinny as it is sometimes called, belongs to the group of hard pressed cheeses, and derives its name in the first place from the name of the county where it was first made, and secondly from the blue mould which develops as the cheese ripens.

It was first manufactured in the western part of the county, and still at the present time this is where it is principally produced, chiefly in the districts around Dorchester and Bridport.

Of its origin little seems to be known, but no doubt it has been made in these districts for centuries. Personally I can trace back its production in my own family for the past 150 years, and in all probability it was produced long before then.

Formerly the means adopted for its manufacture were of a very primitive description. For instance, in my own experience, the milk would be heated in the kitchen boiler or in a crock hung over a wood fire, pieces of the vells or calves stomach used, being put into the milk to coagulate it. The washing-tub had to serve the purpose of cheese-tub as well, and temperatures were judged by the sense of feeling, thermometers being little known. Heavy weights were placed on the cheeses to press them in some cases, whilst in others the old stone presses were used. Some of these are still to be found. I came across some good specimens recently in the Isle of Wight whilst lecturing there. A block of stone weighing some 5 or 6 cwt. is fitted into a frame; to the top of the stone a stout rope is fixed; this is run through an overhead pulley and connected to a small windlass, the raising and lowering process being effected by means of hand-spikes. At the present time up-to-date appliances are to be found in most dairies, whilst scientific methods have taken the place of the old rule of thumb practices.

Formerly Dorset Blue was made only from hand-skimmed milk. After the milk had been set in shallow vessels and allowed to stand for twenty-four hours, the cream was removed with a skimmer, the process being known as hand-skimming. In dairies where the best varieties of this cheese are made this practice is being still maintained. The skim milk, containing

on an average about 1 per cent. of butter-fat, makes a very suitable milk for the purpose.

Since the introduction of mechanical separators a great many makers use a proportion of separated milk with the hand skimmed, and in some cases the cheese is made from separated milk alone. Whilst it is quite easy to make a blue cheese from separated milk, it must be borne in mind that the quality is not so good—the weight of green cheese is less, and there is a greater shrinkage during the ripening of the cheese.

A gallon of skim milk containing 1 per cent. of butter-fat will produce about three-quarters of a pound of ripe cheese, as compared with about half a pound from an equal quantity of separated milk.

The method of manufacture as employed by the best makers of the present day is as follows:—

The evening's milk is hand-skimmed after having been set for twenty-four hours, and then put into the cheese-tub. A little cream will have risen on this by the following morning. This should be skimmed off, and when the whole of the milk has been raised to the required temperature the cream should be heated to about 98° and strained back into the tub, well mixing it with the milk.

The morning's milk is treated somewhat similarly, that is to say, it is set for twenty-four hours, skimmed, and a sufficiency of it is heated—usually about one-fifth part of the bulk—to bring the whole up to the required temperature. The temperature for renneting varies considerably with the seasons of the year, also with the soils from which the milk is produced. For instance, from 68° to 72° is the general temperature for milk produced on a chalky soil in summer, and from 72° to 78° in spring and autumn; whilst milks produced on a heavy soil—clay for instance—require a higher temperature, usually from 74° to 78° in summer, and from 78° to 84° in colder weather.

After both milkings have been raised to the required temperature they should be allowed to ripen together. The length of time this will take varies with the amount of acidity in the milk—as a rule from twenty minutes to an hour. This ripening process is most essential in the making of this variety of cheese, as it is absolutely necessary to have a ripe milk to make a good blue cheese.

When the milk is fit for renneting it should have a decided acid taste and smell, and should show from .3 to .35 per cent. acidity by the acidimeter. Formerly home-made rennet was the only agent used for curdling the milk, but this was often very uncertain in its action, although its use is maintained in some dairies at the present time, as some makers prefer it; if the

rennet is properly made from well-seasoned vells it answers the purpose admirably. The quantity of rennet used—that is, rennet of standard quality, such as Hansen's, Fullwood's, or Bland's, or any other make of equal strength—is 1 drm. to 8 or 10 gallons of milk, which should be sufficient to get a firm coagulation in from three-quarters to one hour. The rennet is thoroughly stirred into the milk for two or three minutes, when the tub should be covered and the milk left to coagulate. This will take from forty-five to sixty minutes. When the curd is fit for cutting it should split clean when the finger or a thermometer is inserted into it, and a little greenish whey will collect in the fracture. It should then be cut with knives or breaker, and allowed to remain till the whey collects in the fractures and covers the surface. Breaking should then be performed by means of an ordinary shovel breaker. The curd should not be broken too fine or stirred for more than a few minutes after it is broken, as this tends to make the cheese dry and hard. Both the cutting and breaking processes should be performed very carefully to prevent loss of fat. After breaking, the curd is allowed to settle in the tub and to develop acidity till the curd sufficiently contracts and draws away from the sides of the tub, so that the hand may be inserted between the curd and the tub. At this stage it should show from .3 to .35 per cent. acidity. The whey is then drawn off, the curd piled in the tub, and left to drain for about an hour, or it may be removed to the curd cooler, and piled and left to drain. In either case it is not often necessary to turn it in less than an hour. Three turnings of the curd are usually sufficient, when it should be fit for breaking up. It should now show about .95 per cent. acidity.

The curd should be broken with the hands in preference to a mill, so that it will not all be of the same fineness. It should be salted at the rate of $\frac{1}{2}$ oz. of salt to each pound of curd. When this is thoroughly mixed, fill into the moulds in coarse cloths, using the small pieces of curd for the outside or coat, and the coarser pieces in the centre. This facilitates drainage and assists in the formation of mould in the middle of the cheese.

After filling into the moulds the curd should be put into the press and allowed to drain and settle for an hour without pressure, when the cheese should be turned, put in muslin and returned to the press, and pressure gradually applied till about 4 cwt. pressure is reached. The following morning the cheese should be turned and the same pressure again applied for about three hours, to get the cheese in good appearance.

The length of time in press is about eighteen hours, when the cheeses are taken to the loft or curing room, where they are placed on shelves. The shelves should have a groove near the

edge to collect any drainage from the cheese, as is the case with Stiltons. Some makers put them into a strong brine when they are taken from the press, and keep them there for four or five days. When this is done the amount of salt used with the curd should be reduced to $\frac{1}{4}$ oz. salt to each pound of curd.

The curing-room should be kept dark, as mould forms more quickly thus than in a strong light; it should have a mild humid atmosphere; a dry or hot room causes the cheese to crack, whilst the evaporation is too great, thereby retarding the formation of mould, and it also makes the cheese dry and hard. A good cheese should be soft and buttery, covered with blue mould and rich in flavour, which is the great characteristic of its variety.

The usual weight of this kind of cheese is about 17 lb. each when ripe. It commands a good and ready sale in any of the Western Counties, whilst the best auction markets are Dorchester and Sturminster Newton. At the former market my neighbour got 110s. per cwt. for some last season, made precisely on the lines I have stated.

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4.—NORTH WILTS CHEESE.

CHEESE has been made in Wiltshire at a very early period. In the Chartulary of Lacock Abbey, "according to the customs of the Manor belonging thereto, a cheese was given to the men who made the hay in the 15th century." And later on, in Queen Elizabeth's reign, the people in South Wilts bought cheese from North Wilts. Very little cheese was ever made in South Wilts, as the Down Country was more suitable for keeping sheep.

North Wilts cheese was at first sold in London as Gloucester cheese, and was no doubt an imitation of the Gloucester article. This continued for many years, but later on, owing to better bred cows, and more expert dairymaids, Wiltshire produced cheese of a superior quality. The farms in North Wilts in the end of the 18th century, and the beginning of the 19th century, were large, and nearly all pasture. The breed of cows kept for cheese making was the longhorn known as the "North Country cow." They were bred in the district, but the bulls were imported from the Midlands. The cows were kept out all the winter, and if the land was very rich, one or two sheep were run with the herd to impoverish the pasture, the idea being that with very rich grass the old-fashioned dairymaids could

not get the cheese to stand, as they did not know how to develop the proper amount of acidity, or to vary it according to the richness of the milk. The principal markets were London and, locally, Chippenham and Marlborough. Cheese was made nearly all the year round, the year's "make" being sold to factors.

Three sorts of cheese were made—thin cheese, broad thick, and loaf cheese.

The two first were generally sold in London as single and double Gloucester respectively. The loaf, which sold for 15s. or 20s. more per cwt., required more skill and labour, and was a much better cheese. This was the product sold as North Wilts.

Every maker seems to have had her own recipe, and even at the present day there is no recognised method of manufacture, Wilts cheese still being made by the old-fashioned rule of thumb, instead of by the modern and scientific methods employed in Cheddar cheese-making.

The old process of manufacture of North Wilts cheese was as follows :—The night's milk was strained into the cheese tub, or was sometimes spread over leads. In the morning the cream was skimmed off and made into butter. The warm morning's milk was added to the skimmed night's milk, and colouring matter put in. Annatto was used even then, but instead of being prepared ready for use in liquid form it was sold in a cake, and had to be ground up, and mixed with a small quantity of milk before being added to the whole.

The rennet was then put in, enough to coagulate all the milk in one hour. Home-made rennet, made from vells soaked in whey and flavoured with sweet herbs, was used. The curd was cut or broken with the hand, or a flat dish, and stirred until firm enough. The whey was then drawn off, the curd broken up again with the hand, put into a vat lined with a coarse cheese cloth, and put into a press. It was taken out again in a few hours, turned and put back into the press in a dry cloth. Some makers kept the cheese under the press for eight days. After remaining in the press for about three days to allow the acidity to develop, the cheese was salted by rubbing salt on the outside at the times of turning. The cheeses were generally put into press by eleven o'clock in the morning, and the principal labour consisted in turning and changing afterwards.

At the present day very little North Wilts cheese is made; its place has been taken by Cheddar, which is a more popular cheese, and one which commands a readier sale.

The small quantity made sells best in Leicester and in the Midlands, although in former days Chippenham was the

principal market. There are only two kinds made now, the broad, about four to the cwt., and flat in shape, and the loaf, which is made in truckles, not like the old loaf cheeses, which were more the shape of large Cheddars.

The only difference besides that of shape, is that the loaf needs a little more care in making, as if the acidity is not right the cheese may not stand and is liable to crack.

The method of manufacture now is very much the same as formerly, except that the makers work with more precision, borrow various improvements from the Cheddar cheese-makers, and use a thermometer. Some use a little sour whey to ripen the curd. Extract of rennet is preferred to the home-made article.

The milk is run at 84° F., enough rennet being used to coagulate the whole in one hour, about $1\frac{1}{2}$ drs. rennet to 8 gallons of milk. The curd is broken with a modern breaker or "stirring stick," and is scalded twice in the whey, the first time to about 90° F., and the second time to about 96° F. After the whey is removed the curd is left for some time in the bottom of the cheese tub, until a certain amount of acidity is developed. Makers vary as to the amount, and very few of them use any test, probably .4 to .5 per cent. The curd is then broken into pieces about two inches square and put into press in a vat lined with a cloth for from twenty minutes to half an hour, according to the acidity, the more acid the curd the shorter the time. It is then taken out, ground, mixed with salt, about 1 oz. to 4 lb. of curd, and put back into press. It is pressed for four or five days, the last day without a cloth, to make a smooth surface.

These cheeses can be sold at six weeks or two months old. They are firm in texture, and have rather a strong flavour.

North Wilts cheese realises nearly as good a price as Cheddar, and taking the butter into consideration also, it seems as if it might be advisable to take steps to stimulate the manufacture of this local product. However, the demand is so small that possibly if the output were increased the price would go down.

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MOORLAND PONIES.

I.—DARTMOOR PONIES.

ALTHOUGH the Dartmoor Pony of to-day cannot boast a very lengthy pedigree, it is certain that there has been a pony stock on Dartmoor for many centuries, from which the inhabitants of the district were supplied with the means of transport for their farm produce, merchandise, &c. The more modern history of the breed seems to begin about a hundred years ago, and there is evidence that the old Devon Pack-horse contributed largely to its foundation. Old inhabitants recall a Mr. Watkins, who had ponies in the Brentor district which were nothing other than dwarfed pack-horses, standing about 13.2. Another early breeder was Mr. Watts, of South Tawton, near Okehampton, who bred a very similar type of pony. Mr. Watts afterwards moved to Meldon, a farm having extensive enclosures and also common rights on Dartmoor, where he continued to run his ponies. They were, however, hardly adapted for the task of getting their living on the poor herbage of the bleak moor, and Mr. Watts sought to improve them in this respect by introducing an Exmoor cross. He purchased two Exmoor ponies—one a black stallion, *Punch*, and the other a grey mare, *Judy*, from a gipsy named Orchard; and by using the small sire on his larger mares he at once produced a pony much more adapted to the cold climate and the poor feed than his original stock had been. Mr. Watts speedily established a reputation for his hardy, well-bred ponies, and his stock was in great demand amongst his neighbours, whilst at the same time pony-breeding on Dartmoor received a considerable stimulus from his success. The use of Exmoor sires to improve the local pony stock spread to other parts of the Moor. On the death of Mr. Watts, about forty years ago, at a time when horses of all kinds were very dear, owing to the Franco-German war, the whole of his stud was offered for sale by auction, and such was the competition to secure the blood that prices ran up to twenty pounds and more, and the average for seventy head, including suckers and yearlings, was fifteen pounds. Since then the history of the breed has been one of steady progress, and there has been a united effort on the part of breeders to get their studs true to type. The following is the description of the Dartmoor pony in Volume V. of the Polo Pony Society's Stud Book :—

THE DARTMOOR DIVISION.

HEIGHT : *Not exceeding 14 hands for stallions, 13 hands 2 inches for mares.* COLOUR : *Brown, black, or bay preferred ; grey allowed ; other colours objectionable.* HEAD : *Should be small, well set on, and blood-like.* NECK : *Strong, but not too heavy, and neither long nor short ; and, in case of a stallion, with moderate crest.* BACK, LOINS, AND HIND QUARTERS : *Strong and well covered with muscle.*

At the present day most of the ponies are bred on the Dartmoor hills, at an elevation of 1,200 ft. to 2,000 ft. above sea-level. The moor is very extensive, there being 50,000 acres



FIG.1. —Dartmoor Pony.

in the parish of Lydford alone, and other moorland parishes have a combined area nearly as extensive. The feed on these hills is of the scantiest, heather and wiry grass being almost the only vegetation, and the climate is so rigorous that only the hardiest animals can survive it. Many of the ponies take their chance upon the moor all the year round, but there is no hard and fast rule about this. Some breeders muster their mares at the end of May, and run them on poor, enclosed land with a stallion. They consider that in this way the mares have a better chance of breeding, and of course the foals will

then be by the desired horse. From twenty to thirty mares are considered sufficient for one horse, particularly where they all run loose together, for unless the stallions are fairly plentiful in these circumstances they will give some mares more service than is necessary and will neglect others. Both mares and stallions are used for breeding purposes from two years on, and continue practically as long as they live. There is a general interchange of stallions every three years, so that their own progeny may not come back to them, and the surplus ones are sold off to go out of the district.

The foals are not dropped before May and early in June, but it is quite common for mares that miss service to get a foal at a later date, and foals are known to fall even up to the end of August. They run on the open moor until mid-winter, when the ponies are usually taken off for two or three months, and put on enclosed moors, but even then it is unusual for them to get any hay, and rough grass-keep is often hired for them at fourpence to sixpence per week, the owner taking all risks. In mild winter many animals are left entirely on the open moor to get their own living.

Dartmoor is for the most part unenclosed except on its outskirts, but the ponies seldom wander, as, like human beings, they have a great affection for their homes, however poor. The herds are marked in a variety of ways. Each of the four quarters of the moor is known by a tape of distinctive colour, which is passed through a small hole pierced in the ear of all ponies. In addition, many owners brand their ponies, generally with an initial inside a small circle, but sometimes with fancy marks. Others, again, adopt a system of ear-marks, so that in one way or another identification presents no difficulty.

As regards attempts at improvement, no success has attended the introduction of Hackney or Arab blood, on account of the loss of hardiness. At the same time Arab and thoroughbred crosses, though ultimately assimilated in the local type, may have done something to bring out some of the finer qualities which these ponies undoubtedly possess, just in the same way as their influence may be traced in other mountain and moorland breeds.

In former times, the markets for these Dartmoor ponies were almost entirely local. They were used by the farmers and tradesmen of the district for every variety of purpose. Nowadays they enjoy a much wider demand. About three hundred go annually into the mining districts of Cornwall, where they are employed by the miner in taking him to and from his work, by hawkers, by tradesmen, and by the smaller farmers. A few years ago a considerable demand sprung up for them in Durham and Northumberland, as pit ponies, but

the restrictions which came into force this year prohibiting the employment underground of ponies below the age of four years, are likely seriously to interfere with the trade. Ireland is becoming a customer, for the farmers of that country are finding out the superiority of these ponies over their native donkeys. America, too, is also a buyer of Dartmoor ponies, and if more pains were taken to register them, so as to get them in at a reduced duty, a very good market would be opened up for them. They have much better riding shoulders than many other pony breeds, and in a team race at Huckaby, on Dartmoor, this year, four Dartmoor ponies ran right away from four New Forest ponies, though the latter were much larger. One difficulty in the distribution of the ponies bred on Dartmoor is the heavy railway rate usually payable. The companies give a reasonable rate for ponies in crates, but pony and crate may not exceed 3 cwt.; anything over is charged as a horse, and the cost of transit of a single pony will then soon add up to more than its value. Unfortunately, the best market for single ponies happens to be the North of England. Again, ponies loaded in cattle trucks having, probably, a considerably lower value than a truck load of cattle, are required to pay a rate which exceeds that charged for cattle by about one third.

The principal fairs for the disposal of Dartmoor ponies are Princetown, first Wednesday in September; South Brent, last Tuesday in September; Chagford, Monday before the second Wednesday in October; Okehampton, Thursday before the second Wednesday in October; Tavistock Goose Fair, second Wednesday in October. Some of the best-known breeders are H.R.H. the Prince of Wales; Mr. J. R. T. Kingwell, South Brent; Mr. R. Coaker, Sherbaton, Princetown; Mr. Coaker, Runnage, Princetown; Mr. T. Palmer, Newington, Tavistock; Mr. H. Redcliffe, Petertavy, Tavistock; Mr. H. Reep, Petertavy, Tavistock; Mr. E. Powell, Lydford; Mr. W. Kennard, Lydford; Mr. Mortimer, Fernworthy, Chagford.

The price of suckers has been low for some years, but the demand showed considerable improvement at the last fairs. Average prices would be:—

| | £ | s. | d. | | £ | s. | d. |
|---------------------------|---|----|----|----|----|----|----|
| Suckers | 2 | 0 | 0 | to | 2 | 10 | 0 |
| Rising Two | 3 | 0 | 0 | to | 5 | 0 | 0 |
| Mares and Foals | 6 | 0 | 0 | to | 10 | 0 | 0 |

Suckers that have been done exceptionally well may make up to four pounds, whilst, on the other hand, the price may run down to thirty shillings, and even less.

The present outlook for this breed is distinctly good, and much is hoped from the Government scheme under which grants will be made for the provision of the best sires, and

it promises well for the success of the proposals that the Government is being advised in the matter by Mr. E. P. Northey, of Okehampton, who enjoys the fullest confidence of all breeders of Dartmoor ponies.

Newington,
Tavistock.

T. PALMER.

II.—EXMOOR PONIES.

THERE is no doubt that ponies have been running in the Exmoor district in a practically wild state for many centuries, in fact their history dates back to times of antiquity. The claim has been advanced that they are originally descended from stock introduced into Cornwall by Phœnician traders over two thousand years ago, but of this, needless to say, there is no confirmation. Exmoor ponies originally formed one single race with Dartmoor ponies, and thus both breeds have a common ancestry, but they became two distinct breeds a great time ago. It may be, as is claimed by many authorities, that all breeds of mountain and moorland ponies have a common origin. Although descended from the same ancestors they have been differentiated by the influence of their environment and by the treatment they have received from the hands of man, into separate breeds, each of which has, at the present day, its own characteristics of colour, type, and temperament.

No one who has a knowledge of the respective breed types of Exmoor and Dartmoor ponies would now confuse the two, although the Dartmoor pony owes much of his improvement to the introduction of a large number of Exmoor ponies some fifty years ago. A few years ago, too, Lord Arthur Cecil purchased an Exmoor Stallion from Earl Fortescue which he mated with his New Forest mares, and was greatly pleased with the cross. It will be seen from this that the Exmoor pony plays an important part in the breeding of other Moorland ponies.

The first person really to take an interest in the breeding and improving of Exmoor ponies was Mr. John Knight, who in 1820 purchased 10,262 acres of Exmoor from the Crown, and at a later date brought his total acreage up to 16,000 by purchasing Sir Thomas Acland's portion. Sir Thomas Acland having sold his Exmoor property moved his original and pure herd to Winsford Hill, near Dulverton. These ponies preserve the full characteristics of the old strain, and at the present day all other breeders when trying to improve their strain like to do so by the purchase of stallions of Sir Thomas Acland's breeding.

Mr. Knight purchased two Dongola Arab stallions. One of these was mated with a number of Exmoor mares, the foals

generally growing to 14.2, but they lost some of the Exmoor characteristics and were not true to colour.

Pandarus, a thoroughbred, succeeded the Dongola horse, and foals of his get were true to colour and smaller, being from 13 hands to 13 hands 2 inches. *Canopus*, another thoroughbred, succeeded *Pandarus*, the result being equally good in respect of size and conformation, but these cross breeds could not endure the hardships of wintering on the moor, so Mr. Knight eventually gave up the use of these horses and used his own stallion ponies. To this day the ponies in the Simonsbath district are somewhat larger than Sir Thomas Acland's ponies, and many of them retain the thoroughbred look transmitted by the Arab sires introduced by Mr. Knight.

At the present day it is the aim of all breeders to get their ponies true to type, and for those interested in these ponies it would be as well to give the following description furnished to the Polo Pony Society for Volume V. of their Stud-book by local committees.

THE EXMOOR DIVISION.

The Exmoor pony should average 12 hands and never be above 13 hands; moorland bred, generally dark bay or brown with black points, wide forehead and nostril, mealy nose, sharp ears, good shoulders and back, short legs, with good bone and fair action.

There are a few grey ponies in Sir Thomas Acland's breed, but no chestnuts.

Of late years more interest has been taken in these ponies by the small breeder, one reason being the desire to win a prize at Exford, South Molton, or Lynton Shows, another reason being the chance of selling a pony or two at a good price to one of the numerous visitors who come to Exmoor during August and September to hunt with the Devon and Somerset Staghounds.

The Lynton Pony Show has been instrumental in bringing about much improvement in the ponies in the Lynton and Brendon district, more improvement being noticed among the ponies run by the farmers on the skirts of the moor than among those who run their mares on the Common.

The majority of breeders give no especial care to their ponies even in winter, and it is surprising how well they do on the poor keep. Other breeders during the roughest weather bring their ponies in off the moor to rather better keep and to more sheltered spots, but even then hay and corn are the exception rather than the rule.

The herds remain more or less in their own localities, and the enclosures of the moor assist materially in this. On Brendon Common there is a certain amount of mixing, but

nevertheless the practice of branding the ponies is not followed to any extent. Two brands are, however, well known to all breeders and purchasers, and are much sought after, namely, the anchor brand of Sir Thomas Acland and the broken spur brand of Lord Fortescue. The former is applied to the ponies at two years old, whilst Lord Fortescue's are branded as suckers. Many of the best ponies are bred on the big enclosures or allotments on the edge of Exmoor, which were once part of the moor, but now are very rough pasture. On Withypool, Brendon, and Porlock Commons the grazing rights are regulated



FIG. 2.—Exmoor Pony.

by the "Commons Act," under which the people of the locality have the right to graze so many head of stock without charge.

In Sir Thomas Acland's herds about eight to twelve mares run with a stallion, but this number is often exceeded in other parts, and thirty mares are not too many. The stallions are used for about eight years, and the mares are kept for breeding up to twelve years. The foals are mostly dropped in the second and third weeks of May.

About three-quarters of a century ago ponies were largely used in this district for carrying packs, corn in pots, farm produce, peat, &c. Their use now is more varied, as they are valuable for foundation stock for breeding polo ponies. They

make excellent boys' hunters, having plenty of courage and being able to go all day; indeed, it is no uncommon sight during a run with hounds to see a man going with the best on an Exmoor pony which has probably never had a feed of corn in its life. Some ponies also make excellent trappers, being very staunch and good movers.

Although bred only locally, Exmoor ponies enjoy much more than local importance, as they are largely used all over the south-west of England, and a considerable number find their way every year to the Midland counties, too often it is feared for a life underground. Each year a few ponies are bought privately to go to America, and in 1911 one of Sir Thomas Acland's ponies was sold to go to Australia.

In proof that the Exmoor pony in common with all the other moorland bred ponies is valuable as a foundation stock, it would be well here to mention that many of our present-day racehorses have pony blood. *Tagalie*, winner of the Derby in 1912, has pony blood in her pedigree. The case applicable to Exmoor is that of *Zoedone*, a winner of the Grand National, and *St. Galmier*, another well-known cross country performer who ran twenty-six times, won eighteen, was second four, and unplaced four times. The sire of both these was *New Oswestry*, and his thirteenth dam on the dam's side was an Exmoor pony.

It is possible that it would pay some of the Exmoor farmers to keep a few pony mares and mate them with a developed pony sire or stallion bred on polo pony lines. Of course it must be realised that in the majority of cases the improved stock would not thrive on the open moor, but then the best and most shapely of them would be more easily sold, and would pay for the extra care bestowed on them in winter, but improved mares are always too delicate to winter on the moor and rear foals afterwards.

The two largest breeders are Earl Fortescue and Sir Thomas Acland. Earl Fortescue some years ago mated an Arab with some picked pony mares, and this cross produced beautiful ponies, but they were not hardy enough for Exmoor. They made good prices, suckers sometimes realising 7*l*. He used to ride a pony so bred as a tufting pony with the staghounds, and though only 13.2 and carrying eleven stone this pony could gallop away from most good horses. Earl Fortescue has a three-year-old pony which promises to be nearly 15 hands high. She is by *Blackmoor* out of *PPSB 1079*, who was by an Arab out of an Exmoor.

The present Sir Thomas Acland fully upholds the traditions of his family in his pride in his ponies. His brood mares on Winsford Hill usually number forty. Each November the suckers go to Killerton, near Exeter, where they stay until two

years old, developing in a marked degree in the warmer climate and with better keep. On their return to Winsford Hill the best mares, if any are wanted, are kept, and the others go to Bampton Fair. Other well-known breeders are Mr. Turner, of Molland, Mr. Richard Westcott, of Hawkridge, Mr. Daniel Evans, of Winsford, and Mr. Smith, of Natsleigh.

Large numbers of ponies are sold at Bampton annually, the Fair being held on the last Thursday in October. Prices, of course, vary. The following realised prices during the past five years show the average :

| | Highest. | | | | Lowest. | | |
|-------------------|----------|----|----|---|---------|----|----|
| | £ | s. | d. | | £ | s. | d. |
| Suckers | 5 | 11 | 0 | . | 0 | 16 | 6 |
| Rising Two . . . | 8 | 5 | 6 | . | 4 | 18 | 0 |
| Mares and Foals . | 6 | 12 | 6 | . | 3 | 10 | 0 |

Two-year-olds on a few occasions have fetched 10*l.* and 12*l.* A pony from the Lynton Show was sold for 25*l.*, ten others have fetched 20*l.* each, and several others have changed hands at from 16*l.* to 18*l.* A stallion realised 25*l.*, and two mares 20*l.* each—to go to America, but these prices were the result of private sale.

The Board of Agriculture fully realises the value of mountain and moorland ponies, and in 1912 appointed a committee to advise as to the best means of improving these ponies and helping the breeder. As a consequence premiums are being allotted to each breed, which will, it is believed, much encourage and stimulate the breeders of ponies. So far no attempt has been made in the direction of the formation of societies for the improvement of the breed, on the lines of those to be met with amongst the Welsh pony breeders.

Ashwick,
Dulverton, Somerset.

A. C. MARDON.

DEVON CATTLE.

FROM earliest records Devons can be traced as the breed peculiar to the county from which they take their name.

The cattle of England may be divided into three varieties—Shorthorns, Middlehorns, and Longhorns. Many assert that Middlehorns, of which the Devon is a variety, are the descendants of the aboriginal cattle of England. There are, however, several other theories as to the source from which the present North Devon has been evolved : that it is sprung from an offshoot of the red Salers cattle, a French breed ; that they may possibly be the result of a cross between the Flanders and those of the country ; or that they may be of Spanish

extraction, introduced by the Phœnicians at the time when they visited these islands to work for tin in Cornwall. Be their origin what it may, the breed has here remained the same from time immemorial ; or if not as perfect, yet without alteration in any essential particular.

According to authorities writing during last century it seems that the original seat of the Devons was in the district bounded by the Taw on the west, extending from Barnstaple to about South Molton, from thence to Bampton, Wiveliscombe, Taunton ; then turning towards Williton and on to the Bristol Channel, which forms its northern boundary ; many, however, confine it to a smaller district. Sprung from within this limited area it has become widely distributed, not only over England but over the world. The reason is easy to find. Its adaptability to local conditions and its exceptional capabilities as a beef breed has assured it new homes.

The breed varies considerably in type ; larger varieties are to be found in a warm climate and on rich pasturage, whilst smaller kinds are to be met with in the colder and poorer districts. Very good results have been obtained from these types crossed with each other, and this interchange of blood has been largely practised. It is essential for any breed that is to be a beef breed to have length, depth, and breadth. If there is one part of the frame the form of which makes an animal valuable it is the chest. It is absolutely necessary that there should be room for those two organs—the heart and the lungs—to carry on their all important functions. In the Devon the chest, besides being deep and broad, is slightly circular. The withers should be fine, and flat sloping shoulders, with a good covering, are looked for. The ribs must be well sprung from the backbone, with a well-hooped and deep barrel for the capacious stomach. The animal must be well ribbed home, with only a small space between the ribs and the hips. A straight back, level from the withers to the setting-on of the tail, with broad and full loins—those prime parts—is what the grazier likes to see.

The hips, of medium width and on a level with the back, should, when handled, present plenty of muscle and fat. The rumps should be full and level and of moderate length, which allows of room for the putting on of flesh in the most valuable part.

This fullness here and the swelling out of the thighs below is of great importance. The flesh on the thighs should not only be thick, but should appear square and almost touching when viewed from behind. The farther down the thigh the flesh is carried the better it is. The setting-on of the tail should be level with the back. The tail itself is thick at the

root and tapering, reaching to the hocks with an ending of a brush of strong hair.

The legs must be straight and squarely placed when viewed from behind, and should not cross or sweep in any way when moving.

The skin should be moderately thick and mellow, covered with a mossy and curly coat. The favourite colour is a deep blood-red, which has given them the name of the "Rubies of the West." White is disliked, though a little in front of the purse in the bull, or about the udder in the cow, is permissible. It is considered a fault if it extends beyond the naval or the



FIG. 1.—Devon Bull.

outside of the flank. It should never be seen on any other part of the body.

The head of the bull should be masculine, with a broad forehead tapering to the nose. A broad muzzle with a flesh coloured nose—a black or mottled nose is disliked—nostrils high and open. Eyes clear, bright, and placid. An ear of medium size and thickness, fringed with hair. The horns should be neither too low nor too high, but placed on at right angles to the head, or even a little elevated. They should be stout, and of a yellow waxy colour at the roots and tipped with a darker shade. In the cow a moderately long head with a

broad indented forehead is desired, and it should taper considerably to the nostrils, which should be high and open. The nose a creamy white, thin ears, a clean cut throat, and a bright, lively, and prominent eye are all points of importance. The horns should match, and should be long and spreading, with ends gracefully turning up. Their colour is similar to that of the bull.

The deep broad and strong chest, the fineness of the withers, the sloping shoulders, the large and powerful forearm, the extensive and swelling quarters, not only denote beef but also strength and activity. During the beginning and middle



FIG. 2.—Devon Heifer.

of last century the Devon ox was well known as a draught animal. "Where the ground is not too heavy, the Devonshire oxen are unrivalled at the plough. They have a quickness of action which no other breed can equal and which very few horses exceed. They have also a degree of docility and goodness of temper, and also stoutness and honesty of work, to which many teams of horses cannot pretend." These are the words of Youatt when writing on this breed. Vancouver, in his survey of Devonshire, says that it is a common day's work on fallow land for four steers to plough two acres with a double furrow plough. They were usually put to work at two

years old, worked till four, five, or six, and then fed for the butcher. Lord Somerville, the great authority on this breed, states that after being worked lightly on the hills for two years they were bought at four years by the tillage farmer of the vales, and worked hard for a further two years and then fed off. The usual team for a plough was four oxen or six growing steers.

The oxen when fat at this age reached great weights, and some of the largest weights ever obtained for this breed were for the large, full-grown working oxen of the old Somersetshire variety. It is nowadays the practice to improve the quality and to produce a greater return of weight per acre, rather than of weight per head.

There was a period of great degeneration in this breed. It started at the beginning of last century. This degeneration was apparently due to the very high price of beef during the wars, and farmers were tempted to sell even their best cows and heifers to the butchers. At that time, as at the present, their aptitude to fatten was such that milk cows in autumn were fit for slaughter. Then again, the high qualities of the breed were beginning to be realised by farmers in other counties, with the result that herds were started in new districts, and prices consequently rose to figures that in those days were considered enormous. With this drain on the best that the county could produce the high quality of the breed naturally suffered, and a class of inferior stock sprang up in the very strongholds which before had been held by a most superior breed. It was also at this time that farmers were attracted by the high price of corn, and turned their attention specially to arable land farming.

Fortunately for the breed, there were still farmers in Devon who were justly proud of their native cattle. Unlike their shortsighted neighbours they held on to and did not sell their best, even though they were offered excessive prices for them. These men retained the animals whose excellence they had spent such pains in producing, and handed them down to their descendants. The name of Francis Quartly, of Molland, will always be associated with the turn of the tide in the progress of the Devon cattle. It was in 1794 that he turned his energy to the improvement of the breed. Not only did he refuse to sell his best, but he often outbid the butchers for the high class stock of less far-seeing breeders. By breeding from and intermingling their stock with his own he built up the famous Champson herd. It is no exaggeration to say that the influence of this herd reversed the current of events, and the tide in the affairs of the Devon breed, which had long been on the ebb, once again began to flow.

At this time cattle shows were not generally established, and it was not, therefore, possible to test the merits of the different herds. It was about 1831 that the Devon Agricultural Society was established at Exeter. After this other shows were started with the result that many began to take an interest in the breed and to desire to obtain well-bred stock. This naturally tended to increase the number of better class animals, and to restore to Devonshire the prominent position she had held in the cattle world.

In 1851 Colonel Davy brought out the first volume of the "Devon Herd Book," which in 1885 was taken over by the Devon Cattle Breeders' Society. This herd book, started on a small scale by a single individual, has now grown to a large size. The number of entries in the book has reached a total of 286 for bulls, and 689 for cows.

The publication of the herd book tended to focus attention to the different strains of blood, and, with the development of railways and better facilities for shipping cattle, has brought about their introduction into numerous counties in the kingdom, whilst they are exported to America, Australia, and to many foreign countries where now large numbers of valuable herds have been established. They are exceedingly popular in these countries, as they soon accommodate themselves to, and will stand the change of, soil and temperature.

The general practice in the management of Devons is for the cows to drop their calves in the autumn. Calves are almost always suckled by the cows, and the custom is to put two calves on to one cow. These are suckled by the cow for three-and-a-half or four months, when they are weaned. Another calf is often then put on to the cow, so that during one milking period she may suckle three calves. After calving, the cows usually receive long hay and two pounds and upwards of some concentrated food such as cotton cake, bean meal, &c., the kind given varying according to the market price.

The cows are generally let out every day, when fine, for air and exercise. The system of putting two calves on one cow is at once seen to be an economical one, as it sets free one half of the cows for dairy purposes. The Devon cow soon becomes accustomed to having a second calf "mothered on to her," and will make an excellent foster mother.

In the early spring, the calves are turned out to grass as soon as the weather permits. In the autumn they are brought in as yearlings and kept through the winter in a store condition, chiefly on hay and mangolds. During the second summer at grass, they are treated in very much the same way as the first, but the following winter they receive a little concentrated food,

and in their third summer they are fed off on grass without any artificial food, unless in a bad season. They thus go out fat on an average from two-and-a-half to three-and-a-half years old.

In some cases they are fed off earlier than this, and may be killed at two years. The Devon bullock is almost always fed in the summer, though occasionally stall-feeding is adopted. Many are sold in a store condition to farmers in Dorset, Herts, Wilts, Surrey, Sussex, Berkshire, Warwickshire, Hants, and other counties.

A well-grazed Devon bullock, when well fed, should easily attain to a live weight of 12 cwt; of course, show cattle weigh considerably more. To take an example, the weight of the champion Devon at Smithfield show in December, 1912, was 17 cwt. 0 qrs. 2 lbs., at two years nine months and three weeks (*Captain*, bred by His Majesty the King). This, however, has been exceeded in old times when bullocks were kept till five or six and then fed off. Most people unacquainted with the breed think that it is a beef breed pure and simple, and that its milking qualities are nil. The Devon breeder claims that it is the best beef breed, and he also claims that the Devon cow can hold her own with a great many cows of a milking breed, at the pail. Where the practice of suckling calves on to a cow is followed it will be readily understood that the milking qualities are not brought into such evidence as when a cow is milked. By careful selection and by breeding from the right cows, however, the Devons can be transformed into very capable dairy cattle. A cow belonging to Mr. W. Kidner, of Kingston, gave 1,100 gallons in eleven months. The milk given is of the highest quality, and cases of cows yielding two pounds of butter per day are recorded.

The Devon breed in their original strongholds have been largely kept from time immemorial by "tenant farmers," thus clearly proving that they are a good "rent paying" breed, especially in cold and hilly districts, where more bulky animals would fare badly; but when kept on rich land they respond very rapidly, and experience has proved that they will flourish anywhere when properly treated. It is to be hoped that, with the visit of the Royal Show to Bristol, the Devon breeder will rise to the occasion and exhibit to the outside public the high qualities of his favourite "Rubies."

S. KIDNER.

Bickley.

Milverton, Somerset.

SOUTH DEVON CATTLE.

THE Royal Show at Bristol next year should afford breeders of South Devon cattle an opportunity which has not come their way for many years of making a striking display comparatively near home of their magnificent cattle, in which they have solved the problem of how to produce the real dual purpose beast, the animal which carries a wealth of flesh for the butcher, of the finest quality, without superfluous fat, which matures rapidly, and at the same time has all the attributes that the dairy farmer requires. The breed has always been noted for its extraordinary dairy properties, and breeders long ago recognised that if they could combine beef and milk in the same animal they would have magnificent rentpayers, and that they could offer to the whole world what its agriculturists most desire. Cows of the best type and character have been selected and the use of bulls of good calibre and constitution from heavy milking dams has enabled the ideal to be attained.

At no period of their history have the South Devons stood higher in the public estimation than to-day. Their position among established breeds has been won by strenuous effort. The establishment of the Herd Book Society was the first forward step, and the careful work done in the selection of animals for registration, the efforts to produce fixed type, character, and general uniformity in the past twenty years have tended to establish a breed which stands, if not unrivalled, at least unexcelled, for dual purpose in the United Kingdom. It has come slowly, but surely, to the front; its recognition has been tardy; it has had no aristocratic backing; its breeders are chiefly—almost mainly—tenant farmers, and it has had to overcome many prejudices and to compel attention by the display in the show ring, and in the national trials, of its consistent merit.

The South Devon is no “new” animal. The breed is of a hardy type, the robust constitution being an invaluable legacy from the past when this class of cattle drew the plough on their native soil. They grow with rapidity to an enormous size, and in spite of their rapid development it is not obtained by the sacrifice in any degree of milk producing capabilities, in which

they take rank with the best. It has, however, been a constant labour to secure the recognition that the breed deserves. The Herd Book Society has co-operated with the breeders, bearing a proportion of the cost of its representation at the Royal and Bath and West exhibitions and at Smithfield, where the animals exhibited have invariably attracted general attention, and comparisons have been all in their favour.

The animals are of a medium red in colour, with good coats, and it is claimed for them that they are not so prone to tuberculosis as some other breeds. For many generations they have



FIG. 1.—South Devon Bull.

been kept in the South Hams; in fact, they represent the survival of the fittest, for other breeds have been tried with little success on the pastures whereon they flourish to-day, to the exclusion of all others, which is strong presumptive evidence that they are the native breed. Such excellent graziers are the South Devons, so rapidly do they mature, and they produce such remunerative returns on the dairy side in milk, rich cream, and butter, that in the last twenty years the area within which they are kept has been constantly expanding, until they now possess a world-wide reputation.

Being such a hardy race of cattle the South Devons require no "coddling" or exceptional treatment to keep them in condition. They can practically take care of themselves in any district where fair pasturage is to be found. Young stock in their native element frequently remain in the fields the whole winter through and keep in capital store condition, when what they can pick up there is supplemented by hay, straw and roots.

Milking cattle do well in the pastures without extra feeding from April to August, and, indeed, many farmers run

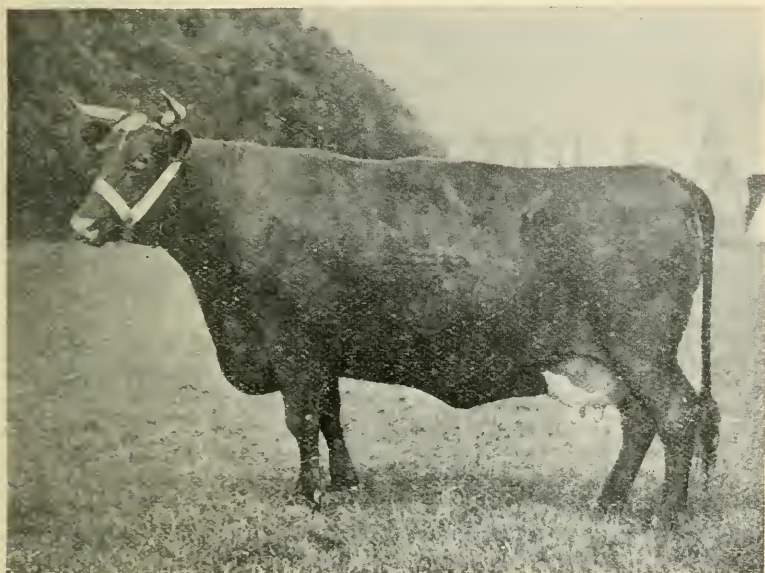


FIG. 2.—South Devon Cow.

them the whole summer through without resort to artificial foods. Those who send milk to the towns, however, find that lactation is stimulated by the judicious use of bran, cotton cake, and brewers' grains where they can be obtained. Where the cows are exceptionally heavy milkers, a few pounds of linseed cake morning and evening never comes amiss, though it may not be essential, and maintains the physique and condition.

With the approach of November, and perhaps a trifle earlier if the autumn prove unusually cold and rough, the milking

stock are taken indoors and remain there at night until April, although the owners of the largest existing herd do not bring their cows in at night unless the ground is snow covered. The shippens have been greatly improved of recent years, and the value of spacious and well-ventilated sheds is generally recognised. The cows benefit by being turned out into the yard and by having a few hours in the pastures daily, unless the climatic conditions are altogether too severe, and that is seldom the case in this country. Cabbages, while they last, are fed to them, together with hay, chaff and pulped roots, and from four to six pounds of cake, linseed or cotton, crushed oats or maize meal, morning and evening. Various feeding compounds are also used. Much depends upon the common sense of the farmer, who must needs keep his eye on the maintenance of the milking qualities and vary the diet to suit it.

The steers fatten freely on good pastures from May to September, requiring very little in the shape of artificials in that period, although it may be necessary where the grass is not particularly good to supplement it by the moderate use of linseed cake. Two-year-old steers of the breed frequently bring a return of 20*l.* or more to their breeders, and those of two-and-a-half years as much as 25*l.*, making them a remunerative investment.

The indoor feeding of cattle in winter differs very little from that of the milkers, except that they need more liberal supplies of cake, linseed bringing them quickly into marketable condition. No hard and fast rule for feeding can, however, be laid down, for every breeder is a law unto himself, and of necessity regulates his practise according to the depth of his pocket, combined with the peculiarities to be overcome in relation to his farm, whether the ground is poor or rich, and whether it is on hilly exposed land, or situate in sheltered valleys; but anyone accustomed to the care of milking cattle, or feeding them for the butcher, will find the South Devons docile, kindly beasts, responding readily to good feeding and needing no extraordinary care to make them remunerative both for dairy and butchery purposes.

These qualities have been so thoroughly demonstrated by long and practical experience that in South and West Devon the South Devon is the dominant breed. In South, East and West Cornwall they are also more numerous, particularly for dairy purposes, and a number of Mid-Cornwall farmers are going in for them. Throughout the West Country generally there are herds here and there, and they do well on such a variety of soils, and under such varying conditions, that it is difficult to say which suits them best.

As far as the future is concerned, it is full of promise. South Devons have been imported to South and East Africa, Australia, New Zealand, the United States, Brazil, China, Jamaica, Colombia, and by the Japanese Government, and wherever they have gone they have maintained their reputation excellently and held more than their own. In South Africa they are a favourite breed. They acclimatise rapidly, prove hardy and vigorous, live nearly always on the veldt, and greatly improve the native stock. Among the first to recognise their value there was Mr. Thomas Hall, the Mooi River breeder.

Mr. T. Bourke, of Pretoria, who has extensive stock interests in the Orange River Colony, seven years ago purchased personally from Messrs. J. Sparrow Wroth (Aveton Gifford), J. D. Ellis (Yealmpton), W. H. Pain (Kingsbridge), and W. H. B. Ash (Ipplepen), bulls which proved to be the progenitors of a magnificent herd of robust animals, reproducing the type and gentle character as well as the early maturity and heavy milking characteristics of their sires and dams at his Karookom Farm of 14,000 acres.

It was mainly due to the success attained by Mr. Bourke's herd that over a score of South Devons were acquired and sent out in 1909 to the Orange River Colony Government Experimental Farms at Tweespruite and Grootole at high figures.

In 1911, Mr. Hamilton Grepe, of Devon Farm, Reddesburg, in the Bloemfontein district of the Orange River Colony, who has imported over 100 beasts from Devon and Cornwall, swept the boards with his South Devons at the Central Agricultural Show, among other awards carrying off the Governor-General's Cup in the dairy cattle competition. He has had ample ground for satisfaction, and found that they stood the dry cold winters of the country well, besides having other qualities to commend them. In a letter from London, on September 27th, 1912, Mr. Grepe wrote: "I may say that our experiment in importing a pedigree herd fulfils expectations. They are proving to be an excellent dual purpose type of cattle and increase in favour with the South African farmers because the bulls improve in size and milk the native cattle of the country. The richness of the milk, and the abundant quantity, please those who sell cream to the creameries. The South Devon forages well on the South African veldt, is hardy, and the oxen are large, heavy, active draught animals." In South Africa the Herd Book Society has a number of members, and in 1910 Sir Hamilton Gould Adams, K.C.M.G., made some purchases of the cattle on behalf of the Land Settlers' League. For the last two years South Devons have beaten all breeds in the milking and butter trials at the Central Show at Bloemfontein.

Leaving South Africa, let us turn to South Australia. Mr. A. S. Chirnside, of Colac, one of the chief stock owners in Victoria, impressed with the high distinction gained by South Devons in butter and milk tests, as well as by their massive appearance, determined to acquire a herd for his Coragulac Estate, and he personally secured Mr. N. Boon's (Malborough) bull *Rew Style* (3016), by *Duke*, and a grandson of *Masher*, the progenitor of some of the best South Devons, for 70 guineas at the 1908 spring sale of the Herd Book Society, and also purchased eleven cows from the late Mr. W. P. Vosper. Three years later the herd had multiplied to forty, and they were in the pink of condition after one of the most severe winters experienced in Victoria, the herd thriving splendidly, so much so that Mr. Chirnside, although possessing some high-class blood in Shorthorns, had decided to devote himself entirely to South Devons. The cows *Janet*, *Alexandra*, *Carnation*, and *Gentle* calved to English sires. For three months—September to November inclusive—*Janet* gave 5,017 lb. of milk and 217 lb. of butter; *Alexandra* 3,643 lb. of milk and 170 lb. of butter; and *Carnation* 3,942 lb. of milk and 161 lb. of butter. Not only has *Rew Style*, which has wonderfully developed, left a fine impression on the herd, but the South Devons received a fine advertisement at Melbourne when he was awarded the Royal Agricultural Show Championship, the reserve being awarded to *Alvie Ham*, a son of the champion. The blue ribbon for females went to Mr. A. E. T. Payne's imported South Devon cow, *Rosebud 2nd*. The thirteen South Devons in the show created a most favourable impression.

Mr. Grigg says of the consignment imported from Messrs. Wood and Whitley's herds to Canterbury, New Zealand, that "they arrived in excellent condition and have been much admired by thoroughly competent judges. Very probably as the breed becomes better known a strong demand will arise for them in the large and important dairying districts of the North Island as well as in the South."

Cyprus has received a foundation herd during the year from Mr. John Wood, of Totnes, and the Director of Agriculture in that island expressed his satisfaction with them, and stated that they speedily settled down to strange conditions.

Such experiences cannot fail to have their effect, and that must eventually be to the benefit of South Devon breeders, who must direct their energies as in the past to seeing that in the development of a breed which invariably is well covered with natural flesh, and turns its food to good account, the milking properties are maintained side by side with bulk and quality.

In order to secure that similarity and uniformity should be obtained in the breed, as its quality became recognised and its reputation extended beyond its native sphere, the Council of the Herd Book Society, of which Mr. Alfred Michelmores, of Totnes, has been the secretary since its formation, drew up several years ago an official scale of points of excellence, which should be an index to breeders of the class of animal at which they should aim, and the efforts made to reach the standard have been so general that to-day animals failing to fulfil these characteristics are the exception in the herds of the large number of careful breeders.

The "points," which give a good idea of the class of beast the South Devon is, are as follows :—

Generally.—Rich medium red in colour, hide of moderate thickness, loose, and mellow, well covered with soft curly hair, straight over the back and rump, deep and full in girth, and full at the chest, shoulders covered at the points, and flat on the top, bone of moderate size, tail commencing from line of back, and hanging below the hock with a good brush, pins fairly wide, but not very prominent, flanks deep, forming straight underline, full and deep in rounds, rump well filled and straight from leg to pin, ribs wide, deep, and well back to the pin, nose white and wide.

Bulls.—The head massive, and broad in the forehead, but not coarse, wide from eyes to nose, and well covered with curly hair, eyes wide apart, nose white and wide, horns white or yellow, wide at base, and tapering with downward tendency.

Females.—The head broad, and of medium length, eyes full, horns white or yellow, wide at base, tapering, and fairly straight, the udder well forward, and projecting behind, not too fleshy, teats of fair size, regular and well distributed.

It may be mentioned also that the Herd Book Society have prepared a pamphlet on the breed, which is printed in English, Dutch, Spanish and Portuguese, and this should prove particularly valuable in introducing the breed to prospective foreign purchasers. The illustrations of a typical bull and heifer which are printed on pages 54 and 55 are those which also appear in the pamphlet.

The claim that the South Devons are the heaviest cattle in the world, and that they excel both for beef and milk, at first sight would appear to be hard to sustain, but it will not be difficult to substantiate the assertion in both respects. Dealing first with the prolific milk yields, one experiences the difficulty that no regular system has yet been instituted for keeping daily records, and it is consequently necessary to quote performances in open competitions, and add to them

the assurance that the cattle taking part in them are but good examples of the bulk, and that at home there are scores and hundreds equally good.

The Society owes much to the late Mr. W. P. Vosper, of Merafield, Mr. J. S. Wroth, of Aveton Gifford, Mr. T. Cundy, of Devonport, and Messrs. Whitley, of Paignton, for keeping the breed in the forefront at the chief milking trials.

In 1904, at the Dairy Show, Mr. Thomas Cundy's *Primrose* attracted widespread attention to the South Devons by her big triumph. Among 144 competitors she scored 139·3 points—or 17·3 above her nearest opponent—won the Barham Challenge Cup for milking trials, the Spencer Challenge Cup for the greatest number of points in the Show by inspection, milking trial and butter test; and the Lord Mayor's Cup for the best cow, other than shorthorns, in the milking trial and butter test.

In 1905 the South Devon cow *Alice* won premier place for dairy qualities against all breeds (excluding Channel Islands) at the Royal and at the Dairy Show. Mr. Cundy's *Sweet Briar* got within two points of securing the Lord Mayor's Cup. At the 1903 and 1904 Bath and West Shows, Mr. Cundy's cows won the milk and butter tests against all comers, while Mr. Vosper's *Honesty 3rd* repeated the performance at that Society's Nottingham Show in 1905. In the following year, at the Dairy Show, where, for the first time, South Devons had a class to themselves, Mr. Cundy's *Iris* in 24 hours yielded 63·15 lb. of milk, producing 2 lb. 0½ oz. of butter in 24 hours, was reserved for the Barham Cup, and took the champion trophy for any other breed but Shorthorns and the prize for the most and best butter. In the same year Mr. Vosper's *Primula* carried off first in the milk test at the Royal, first for milk and second for butter at the Bath and West, and first inspection prize at the Dairy Show.

At the 1907 Newport Show of the Bath and West Society Mr. Vosper's *Honesty 3rd*, 94 days in milk, yielded 61·2 lb. of milk, from which 2 lb. 7¼ oz. of butter were made, in 24 hours beating all breeds for both butter and milk. Mr. Wroth's *Nosegay 4th*, in milk 123 days, stood second with 45 lb. of milk and 1 lb. 10½ oz. of butter, and Mr. Vosper's *Dairymaid* third.

Experiments made at the Royal Show at Lincoln (*vide* official report) in 1907 proved that the milk of the South Devon and Channel Island breeds of cattle produced the best and most valuable cream. At the last five exhibitions of the Royal Agricultural Society the performances of the South Devons—and the weight of the cows should be considered in conjunction with other factors—have been as follows :—

| | Live weight | Days in milk | Milk Yield, 24 hours | Butter Yield | Ratio, Butter to Milk |
|--|--------------|--------------|----------------------|--------------|-----------------------|
| 1907. <i>Lincoln.</i> | | | Lb. oz. | Lb. oz. | Lb. |
| ¹ Mr. W. P. Vosper's <i>Honesty 3rd</i> | 1,498 | 113 | 57 0 | 2 0½ | 28·06 |
| Mr. J. S. Wroth's <i>Nosegay 4th</i> | 1,540 | 142 | 36 8 | 1 9½ | 22·90 |
| 1908. <i>Newcastle.</i> | | | | | |
| Mr. W. P. Vosper's <i>Cowslip 5th</i> | 1,820 | 61 | 49 8 | 1 6¾ | 34·81 |
| Messrs. Whitley's <i>Fancy</i> | 1,491 | 58 | 53 10 | 2 3½ | 24·34 |
| " " <i>Nosegay 4th</i> | 1,540 | 75 | 43 12 | 1 6¾ | 30·76 |
| 1909. <i>Gloucester.</i> | | | | | |
| Mr. W. P. Vosper's <i>Cowslip 5th</i> | 1,792 | 114 | 58 14 | 2 8½ | 23·25 |
| " " <i>Victoria</i> | 1,414 | 113 | 50 14 | 2 3½ | 23·09 |
| Messrs. Whitley's <i>Beauty 2nd</i> | 1,694 | 96 | 55 0 | 2 3½ | 24·96 |
| " " <i>Peeper</i> | 1,596 | 143 | 50 8 | 1 12½ | 28·35 |
| 1910. <i>Liverpool.</i> | | | | | |
| Mr. S. Vosper's <i>Victoria</i> | 1,410 | 95 | 53 14 | 1 8¾ | 34·82 |
| Mr. W. P. Vosper's <i>Cowslip 5th</i> | 1,785 | 97 | 67 10 | 2 3 | 30·91 |
| ² " " <i>Daisy</i> | 1,500 | 108 | 52 14 | 1 14¼ | 27·96 |
| Messrs. Whitley's <i>Handsome</i> | 1,535 | 105 | 49 12 | 2 0½ | 24·49 |
| " " <i>Pansy</i> | 1,500 | 74 | 59 10 | 1 15½ | 30·28 |
| 1911. <i>Norwich.</i> | | | | | |
| Mr. T. Cundy's <i>Red Rose</i> | Not recorded | 100 | 48 0 | 1 4¾ | 37·01 |
| Messrs. Whitley's <i>Daisy</i> | | 48 | 72 6 | 1 1½ | 66·19 |
| " " <i>Lorely</i> | | 61 | 34 2 | 0 8½ | 64·23 |

¹ Second in open milk test.² Third in open butter test.

The average ratio of 27·07 lb. of milk to 1 lb. of butter for five shows was raised to 31·37 lb. by the temporary failure of Messrs. Whitley's cows at Norwich. *Daisy*, however, yielded more milk (the fat percentage was 3·05), and obtained more points than any other cow for it. At Tring in August, after being 90 days in milk, she beat 82 cows of all breeds with 72 lb. 2 oz. of milk and 2 lb. 4½ oz. of butter in 24 hours, and at the Dairy Show in October, when her lactation period had been 146 days, she yielded 67·3 lb. of milk—a quantity unexcelled by any pedigree animal shown—and secured 144·8 points. From it 2 lb. 6¾ oz. of butter were made. Mr. T. Cundy's *Myrtle* produced 48·9 lb. of milk and 2 lb. 3 oz. of butter (taking third in the open butter test), and Mr. J. Luscombe's *Dina 3rd* recorded 58·9 lb. of milk for the 24 hours' test.

It may be noted that at Newcastle (1908) *Cowslip 5th* gave 66 lb. of milk and 3 lb. of butter on the day before the test, but being in "kine" on that day, her yield fell, recovering, however, before she left the yard; and at Tring the three cows sent up by Mr. Vosper obtained more points than any other three of one breed.

There was a milk and butter test at the Bath and West Show at Exeter in 1909 extending over three days, and in these

the two South Devon competitors (Mr. Vosper's) gained third and fifth prizes, the milk yield being 167·4 and 167·14 lb., and the butter production 6 lb. 10 $\frac{3}{4}$ oz. and 5 lb. 4 oz., the ratio of butter being 25·06 and 26·86 respectively, the South Devons securing second and third in milking tests. They did better in 1910 by securing both first and second in the milk and butter tests at the Bath and West Show, one cow producing over 7 gallons of milk and the other over 3 lb. of butter. At Tring *Cowslip* 5th was third for butter and fourth for milk, and at the Dairy Show *Honesty* 7th gave 125·7 lb., and Mr. Cundy's *Iris* 122·8 lb., in the two days' milkings. The breed also won distinction at the Dairy Show, where Messrs. Whitley's *Fancy* (bred by Mr. T. Willing) captured the Spencer Cup with 120·9 points, with Mr. Vosper's *Ladybird* third, scoring 120·5 points, and both giving over 50 lb. of milk in the day's test.

Mr. J. S. Wroth reports that one of his cows was in milk for 261 days, and gave 1,047 gallons, equivalent to 4 gallons a day, and during one period of lactation six cows belonging to Mr. R. E. Cocks, who possesses a large milking herd at Raneleigh, Wembury, averaged 969 gallons.

As previously indicated, the animals mentioned are but typical, but it would be no difficulty to find a vast number of South Devons which could be guaranteed to produce from three to four gallons daily during the period of lactation, and when they have served their day in the dairy they can be rapidly ripened for the butcher.

The South Devon is *par excellence* a dual purpose animal. The breed has been known at Smithfield for twenty years or more, and their bulky and symmetrical carcasses, with their record of rapid flesh forming, has commended them to the butcher, who looks for quality combined with substance, and it has been found that the breed is exceedingly profitable, producing heavy rounds and being very good in the loin, with deep, thick ribs, while the proportion of lean meat to fat is exceptionally high.

It is no unusual circumstance to find steers in the Christmas markets with a live weight of a ton or more, and on many occasions that weight has been greatly exceeded by the colossal bulls which have figured so prominently in the Royal and other showyards.

Probably the heaviest beast yet bred was *Coleridge Hero*, a noted prize-winning bull, bred by Mr. W. J. Crossing. His live weight was 30 cwt., and when killed at Plymouth in 1907 his flesh was found to be of a very rich colour and fine quality. He was 6 $\frac{1}{2}$ years old, and his dead weight 18 cwt. 7 lb.—fore-quarters were 5 cwt. 10 lb. and 4 cwt. 3 qr. 6 lb.; hind-quarters 4 cwt. 13 lb. and 4 cwt. 6 lb. He carried 19 score of loose fat,

and his hide weighed 210 lb., but the bone was exceptionally small.

In 1904 Mr. F. W. Rowe (Lostwithiel) won the West of England Show Championship at Plymouth against 82 animals of various breeds with *Sweet Briar*, a heifer which alive weighed 17 cwt. 3 qr. 8 lb., and dead $11\frac{3}{4}$ cwt., with 164 lb. of loose fat. The next year 74 competed for the honours, and another Cornishman (Mr. W. M. Roberts) was placed first with the ox *Jumbo*, but 1 lb. short of $22\frac{1}{2}$ cwt. The Smithfield winners were out of the championship record here. Of Mr. F. W. Rowe's winner the butcher's report was that "the flesh set beautifully firm, and there was no waste in cutting."

Mr. B. Luscombe's (Aveton Gifford) first prize steer at Smithfield in 1907 at 23 months 26 days weighed 15 cwt. 1 qr. 5 lb., and showed an average daily gain of 2.37 lb. and percentage of carcass to live weight of 66.78, the hind-quarters being 64 lb. heavier than the fore. The daily gain in weight was unapproached by any breed there. In the block test Mr. Wroth's heifer was first when alive, and her carcass scaled 1,179 lb., the percentage to live weight being 64.95, and each hindquarter proved to be 12 stone in advance of the fore-quarters. The butcher who purchased her reported that she carried the most flesh on her back he ever saw, and was most satisfactory, without an ounce of waste, full of good quality lean, and of delicious flavour.

In 1908, at Smithfield, Mr. W. M. Roberts' *Erney*, which took the breed prize at Smithfield, had a live weight of 2,114 lb., daily gain of 2.05 lb., and percentage of carcass to live weight of 62.34. Mr. J. S. Wroth's South Devon under two years old was fourth in the carcass competition.

In 1909 Messrs. Whitley won the chief breed prize at Smithfield with *Primley Manager II.*, weighing 16 cwt. 1 qr. 6 lb. Mr. F. W. Rowe, who was second with *John Peel*, showed in various exhibitions in the West the 22 months old steer *Robin Hood*, which weighed 15 cwt. 1 qr.; and many have been and are annually prepared for the Christmas sales which reach that figure, and 18 cwt. when under three years old.

Mr. T. Winser sold one under two years old in December, 1910, the live weight of which was $17\frac{1}{2}$ cwt., for 43*l.* 5*s.*, this being a remarkable illustration of what the breed can do in early maturity, and how remunerative it is to the feeder. In the same year Messrs. Whitley obtained 47*l.* 10*s.* for a fat ox aged two years and eight months, while at Newton Abbot in December, 1911, a steer over two-and-a-half years, exhibited by the Misses Carew (Haccombe), realised 51*l.* 10*s.*

Five breeders were represented at Smithfield by leviathan

oxen in December, 1911, Mr. F. W. Rowe winning the breed prize with *His Majesty*, a steer scaling 19 cwt. 2 qr. 21 lb. at 2 years and 8½ months, and showing one of the largest gains of recent years for an old steer. Second was placed Mr. J. S. Wroth's *Sir Reginald*, a month older, and 2 cwt. 1 qr. less, and Mr. Harris, "the Sausage King," who purchased him, reported that his 12 cwt. of beef was "the best that he had seen." Messrs. Whitley's reserved and commended oxen showed daily gains of 2·3 lb. and 2·32 lb., and percentages to live weight of 65·12 and 64·89 respectively.

Such records as these are convincing, but to them may be added, with pride and satisfaction, Messrs. Copper & Son's (Poplar) report to the breeder on a South Devon steer purchased at Smithfield: "An extraordinary butcher's bullock. Not one ounce of superfluous fat on the whole carcass. Flesh beautifully engrained like marble. Speaking as a practical man with a lifetime experience of both live and dead markets, and a purchaser of cattle at every Club Show at Smithfield for over twenty years, I don't think I ever saw his equal. In my opinion, if you had entered him in the carcass competition he would have swept the board."

Among the principal breeders of South Devons in Devon and Cornwall are Messrs. W. H. B. Ash (Ipplepen), N. Boon (Malborough, Kingsbridge), H. Bradridge (Ashburton), J. Messer Bennetts (Truro), Butland Bros. (Plympton), D. Camp (Modbury), J. Coaker (Paignton), W. Coaker (Charleton, Kingsbridge), E. R. Cocks (Wembury), W. J. Crossing (Plympton), J. D. Ellis (Yealmpton), G. H. Eustice (Hayle), H. Fairweather (Kingsbridge), B. J. Fish (Totnes), J. S. Ford (Yealmpton), F. Furneaux, L. Furneaux (Berry Pomeroy), J. S. Hallett (Brixton), J. N. Harris (Modbury), W. S. Harris (Stoke Gabriel), J. C. P. Harvey (Pamflete), S. S. Horton (Loddiswell), W. P. Kellock (Totnes), J. Leach (Lanreath), B. Luscombe (Aveton Gifford), J. Luscombe (Kingston, Kingsbridge), E. B. Luscombe (Loddiswell), T. W. Luscombe (Totnes), R. B. Meathrell (Revelstoke), W. Merry (Plympton), F. B. Mildmay, M.P. (Ivybridge), Sir Lewis Molesworth (Grampond Road), W. H. Pain (Kingsbridge), W. Paige (St. Germans), J. M. Peeke & Sons (Harbertonford), F. W. Rowe (Lostwithiel), J. E. Shinner, R. Shinner (Staverton), E. Stooke, J. Stooke (Brixton), R. B. Trant (Liskeard), B. J. Toms (St. Keyne), Alfred Tucker (Harberton), W. H. A. Tucker (Fowey), J. J. Tucker (Menheniot), W. Vosper (Mamhead, Exeter), Joshua Wakeham (North Huish), T. S. Walters Symons (Chillington), T. Willing (Ipplepen), W. & H. Whitley (Paignton), F. J. Wintle (Kingsbridge), J. S. Wroth & Sons (Aveton Gifford), John Wood (Totnes), and J. H. R. Wills (Stokenham).

The last-named sold the bull *Eclipse* for 120 guineas—the highest known price, apart from animals purchased for export—to Lord Howard de Walden, in 1909. He was purchased as a yearling for 55 guineas from Mr. N. Boon's herd, from which many high-priced and noted bulls have sprung. *Rew Style*, for instance, the Victorian champion, and *Rew Forster*, which made 72 guineas at seventeen months old, a son of *Minister* (bred by Mr. J. S. Wroth), which Mr. Grepe acquired of Mr. Boon for three figures, and beat all breeds with him in South Africa. Incidentally, Mr. Boon's record of highest prices at spring bull sales at Totnes illustrates the advance in the value of good specimens. These are 40 guineas, 50 guineas, 55½ guineas, 70 guineas, and 72 guineas, the latter, with two exceptions, the best obtained. At the autumn sale the highest prices recorded were in October, 1912, when *Leigham Boy* (calved January 12, 1912) and *Leigham Laddie* (calved November 25, 1911) were sold for 67 and 66 guineas respectively, both being bred by Messrs. Butland Bros.

The Herd Book Society holds sales of pedigree stock at Totnes on the first Thursdays in April and October, and those who desire to see a really representative collection of male animals of the South Devon breed should attend the spring sale and see the bulls then offered after they have been running more or less rough the winter through. They are offered in three classes: exceeding twenty months old, between twelve and twenty months old, and from eight to twelve months old, the bulk of the animals usually being from twelve to twenty months old, and those exceeding that age fewest.

Last April at the sale about a score fetched 30 guineas and over, most of those changing hands going at from 20 to 30 guineas, for which price sturdy, useful animals for home farms are obtainable, but those who require the very best must be prepared to pay for milk and beef progeny. There are usually at least 100 bulls at the spring sale and about half that number at the autumn sale. At the local markets and fairs pedigree stock is occasionally offered, but, speaking generally, owners of herds are chary of parting with reliable females, which are in demand at from 25 to 40 guineas. To obtain good pedigree dams the most satisfactory method to pursue is to get into direct touch with the breeders, or watch for the dispersal of well-established herds. Over 10,000 pedigree bulls, cows and heifers figure in the Herd Book.

ROBT. DRENNAN.

Totnes, Devon.

DORSET HORN SHEEP.

THIS breed of sheep, which is one of the oldest mutton breeds in the kingdom, and unrivalled for its fecundity, is widely distributed, being found not only on the extensive sheep walks of Dorsetshire, but extending into Somersetshire and the Isle of Wight, whilst very choice flocks are found on the borders of Devonshire, and in other more distant English counties, as, for example, Hertfordshire and Yorkshire. It has also found its way into America, Canada, New Zealand, and Australia.

HISTORY AND ANCESTRY.

The earliest records of the breed go back to 1693, when Edward Lisle, in *Observations on Husbandry*, published by

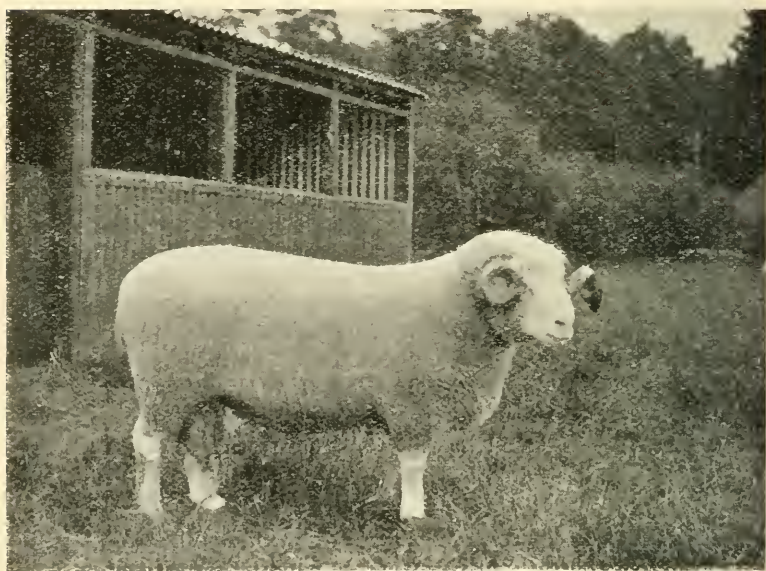


FIG. 1.—Dorset Horn Shearling Ram.

his son in 1757, describing his journeys into Dorsetshire, remarked on the fecundity of the Dorset Horn Breed, saying that his tenant had ewes which brought him lambs at Christmas, which he sold fat to the butcher at Ladyday, and at the beginning of June, thinking his ewes fat, went to sell them to the butcher, who, when he handled them, found their udders springing with milk and near lambing, and eventually they did lamb early in June. Another early writer to mention

the breed is William Ellis, who, in his *Shepherds' Guide*, published in 1749, described the Dorsetshire sheep as having white faces, white and short legs, broad loins, and fine curled wool; he also records that they were good mothers, being especially careful of their young.

The first known coloured illustrations of Dorset Horn Sheep appeared in a work on the *Domestic Animals of the British Islands*, by Prof. David Lowe, F.R.S.E., published in 1841. These sheep belonged to Mr. Michael Miller, of Plush, near Dorchester, who possessed the last pure flock of the original Dorset Horn Sheep in the kingdom. These illustrations are now in the possession of the present writer.

These sheep, which from time immemorial had been naturalised in the county of Dorset, possessed small horns,



FIG. 2.—Dorset Horn Ewes.

common to both male and female; they had white faces and legs, their wool being very fine, and weighing about four pounds to the fleece. Their limbs were somewhat long, shoulders low, loins broad and deep, whilst their lips and nostrils were black with a tendency to assume a fleshy colour; they were very hardy, docile, suitable to the practice of folding, and capable of subsisting on scanty pastures; they were, too, very remarkable for their fecundity. Specimens of the breed

exported to New Zealand in 1906 produced 200 per cent. of lambs.

It is not too much to say that the Dorset Horn Sheep excels all other breeds in fecundity and early maturity, as well as in its capacity for adapting itself to all localities and varieties of climate, from the chalk and limestone hill farms of the Isle of Wight and Dorset, to the vales of Somerset and Devon.

The breed was first accorded a place in the prize lists of leading British shows in 1862, and has since been very much improved. It is a pure blooded breed in the strictest sense of the word.

DESCRIPTION OF THE BREED AT THE PRESENT DAY.

During the last fifty years owing to the enterprise of many eminent breeders, amongst whom we may mention the names of Messrs. Henry Mayo, Cokers Frome; W. Hull, of Druce; G. Pitfield, of Eype; W. R. Flower, of West Stafford; W. A. Johnson, of Piddletown; Sir Everard Hambro, K.C.V.O., of Milton Abbey, W. J. Chick, of Stratton, A. Johnson, of Symondsburry, W. Elworthy, of Monkton, C. Hawkins, of Waddon, C. B. Stiby, of Bradford Peverell, C. Scott, of Preston, Dorset; John Kidner, of Dodhill; S. Kidner, of Milverton; F. J. Merson, of Bridgwater, W. England, of Taverstock, Somerset; L. C. Attrill, James Attrill, and H. Cawley Way, of the Isle of Wight, the breed has been much improved. Success has attended their efforts to such an extent that the best Dorset Horn lambs arrive at maturity quite as early as the Down breeds. The improved breed may now be described as straight and deep in the body, ribs well arched, loins broad, and the neck well set on. They are full in the shoulder without coarseness, and the hind limb well let down towards the shank, forming a good leg of mutton with small bone. The general features are pleasing, the head standing well up, the horns thin, with a symmetrical curl, the eye quick and lively, the face rather long and thin, the lips and nose pink, or flesh coloured. They still deserve their reputation as excellent mothers and good folding sheep, and the mutton is well flavoured. Although they have been so much improved, they have nevertheless retained their hardiness and fecundity.

In the year 1891 the Dorset Horn Sheep Breeders' Association was incorporated with the object of encouraging the breeding of Dorset Horn Sheep at home and abroad, and the maintenance of the purity of the breed. The Association is managed by a Council of twenty-four members, with a President and Vice-Presidents who are ex-officio members of the Council, the headquarters of the Association being at Dorchester.

The Association has established a standard of excellence for the breed as follows :—

Rams.—Bold masculine appearance, and of robust character, head of great beauty, with strong and long horns growing from the head well apart on the crown in a straight line with each other, and coming downwards and forwards in graceful curves as close to the face as may be without necessitating cutting.

Ewes.—Appearance bright with feminine characteristics. The horns much smaller and more delicate than in the ram.

GENERAL CHARACTERISTICS.

Head broad, full and open at the nostril, well covered with wool from brow to pole, face white, with pink nose and lips.

Ears.—Medium size and thin.

Teeth.—Flat, chisel-shaped.

Neck.—Short and round, well sprung from shoulders, with no depression at the collar, strong and muscular, especially in the ram.

Chest.—Well forward, full and deep.

Fore Flank.—Full with no depression behind the shoulder.

Shoulders.—Well laid and compact.

Back and Loin.—Broad, long and straight, with well sprung ribs.

Quarters.—Full, broad and deep, with flesh extending to the hocks

Ribs.—Well sprung from the back and deep at the sides.

Tail.—Well set up in a line with the back, wide, firm and fleshy.

Legs.—Well placed at the four corners, straight between the joints, with plenty of bone, well woolled to or below the knees and hocks.

Fleece.—Of good staple and quality, compact and firm to the touch.

MANAGEMENT.

The general management of the breed is as follows :—

About one to one and a half ewes are kept to the acre, and the flocks vary from 150 to 1,000 according to the area and the quality of the land, and the amount of water-meadow and pasture attached to the farms. In summer they require plenty of room, being allowed to roam the pastures, downs, or "sheep walks," by day, and being folded on the arable land at night. They take to the ram fully two months earlier than any other breed, the rams being put with the main flocks about June 20, and the general time for lambing is from the middle of November to Christmas. In ram breeding flocks the ram is put in somewhat earlier, so that the ewes start

lambling as soon after November 1 as possible. The ages of all sheep entered in the Flock Book and at the Shows date from November 1.

In August the breeding flock clears up the after shear, and runs on any pasture available. Dorset Horns generally lamb down on grass, a few roots being carted out to them. Lambing pens are not generally used, a few thatched hurdles only being required at times for shelter, as it is customary to lamb them in the open, and being very hardy they are kept much healthier by so doing.

About a fortnight after the lambing the ewes are drafted off on to roots, commencing with turnips and then on to swedes; creeps are provided so that the lambs can run forward and get the most succulent mouthfuls of whatever crops they are folded upon. As soon as the lambs can eat they get linseed cake and lamb food, the quantity being unlimited so long as they clear the troughs. The ewes with singles get 1 lb. per day of cotton cake and oats, whilst those with twins are allowed from 1½ to 2 lb. per day. The lambs are weaned in March on swedes, if possible, or on rye with mangel and cake. When water meadows are available they go into them about the beginning of April. The offgoing ewes are drafted out in May, whilst flock ewes run behind the lambs to clean up. After weaning, the ewe lambs are put on to young seeds, vetches and rape until September, when the early turnips are ready for folding. Those flock masters who fat their wether lambs and sell them "off the teat," send them to the local weekly markets, where they are purchased by dealers early in the season to go to London, Birmingham and Cardiff. At Dorchester Market in the spring can be seen weekly from 800 to 1,000 fat lambs off the teat, whilst large sales of store lambs and offgoing ewes are held at Dorchester the third Thursday in May, when from 10,000 to 15,000 store lambs and ewes are generally penned. The offgoing ewes are purchased for crossing with Southdown and other Down rams for the production of early lamb. In this case the rams are put with the ewes the first week in May, and drop their lambs in September and October. Large numbers of these ewes are taken into Hertfordshire, Hampshire, Norfolk, and many Midland Counties.

The sales of rams and ram lambs are held in May at Dorchester, at Newport, Isle of Wight, and Taunton, Somerset. The great annual breeders' sale of rams and ram lambs is held at Dorchester the third Thursday in May, when from 150 to 200 rams are submitted to auction. At this sale prizes are given, and the 25 guinea challenge cup given by the Dorset Horn Sheep Breeders' Association for the best pen of ram

lambs is competed for, many rams and ram lambs being sent from the Isle of Wight and Somerset to compete.

FAIRS, SALES AND PRICES.

The principal fairs for the sale of Dorset Horn Sheep are held at Dorchester in May, July, August and September. The September fair, known as Poundbury Fair, is principally for in-lamb Dorset Horn ewes that have been put to Down rams, and at this time of the year many can be seen with lambs by their sides. About 10,000 of these sheep are penned at this fair. Sales are also held in the spring and autumn at Beaminster, Bridport, Crewkerne, Taunton, and at Newport in the Isle of Wight.

At the ram sales at Dorchester ram lambs fetch from 5 guineas to 30 guineas each, shearling rams from 8 guineas to 35 guineas each. The draft ewes at the fairs make from 47s. to 60s. each, according to quality, in a good season.

The best flocks when dispersed often average from 70s. to 80s. each. Fat lambs off the teat make from 35s. to 44s. each in an average season. Foreign buyers give long prices for the best Dorset Horn Sheep for exportation, and the best shearling ewes will make from 10 to 15 guineas each, and shearling rams and ram lambs from 25 guineas to 40 guineas each.

WEIGHTS AND EARLY MATURITY.

The special and peculiar feature of the breed is that the ewes come in season as early as April or May, and can breed lamb for the Christmas Markets weighing from 10 to 12 lb. per quarter at from ten to twelve weeks old; the ewes, when fatted off with the lamb, will weigh from 22 to 28 lb. per quarter. Wether sheep when ripe weigh from 20 to 23 lb. per quarter. In 1907 a pen of Dorset Horn wether lambs bred by Mr. Charles Scutt, of Wyke Oliver, Weymouth, and exhibited by him at the Smithfield Club Show at the age of eleven months and three days, gave the following weights:—Live weight, 5 cwt. 3 qrs. 18 lb. the pen of three; average daily gain, 0·63 lb.; average weight of dressed carcass, 136 lb.; average percentage of carcass to gross live weight, 62·38 lb. Again, in 1908, a pen of wether lambs bred by Mr. C. Hawkins, of Waddon, Dorchester, aged eleven months and fourteen days, gave these results:—Live weight, 5 cwt. 3 qrs.; average weight of dressed carcass, 132 lb.; average percentage of carcass to gross live weight, 61·68 lb.; average weight of skins, 16 lb.; average weight of loose fat, 15 lb.; average daily gain of live weight, 0·62 lb. These sheep were purchased by Messrs. Polgate & Son, who stated that they were full of lean flesh and very fine meat. At the Smithfield Club Show this year

(1912) Messrs. G. A. & R. A. Kingswell's pen of Dorset Horn lambs (cup winners), 310 days old, were 217 lb. in weight, and made an average daily gain of 0.70 lb., a figure exceeded by very few breeds.

WEIGHT AND PRICES OF WOOL.

Dorset Horn wool is famous for its whiteness, its freedom from kemp, and its superior quality. It is much sought after by Welsh, Bradford, and Leicester buyers, and large sales by auction are held at Dorchester in July, which are attended by purchasers from these and other centres. Most of the best wool goes into Wales and Yorkshire, whilst Leicester buyers take the bulk of the Horn lamb wool. At the sales in July last, Horn fleeces made from 14 $\frac{3}{4}$ d. to 16 $\frac{1}{2}$ d. per lb., and Horn lamb from 14 $\frac{1}{2}$ d. to 16 $\frac{1}{2}$ d. Very little unwashed wool is shown, and the breeders are very keen and careful about the get up of their clips. Doubtless this accounts for the keen competition, for it is generally remarked by the buyers that the get up of the Dorset Horn wools is far in advance of those with which they deal in other counties. Shearing takes place about the middle of June, and both the lambs and the ewes are shorn. The lambs cut from 2 $\frac{1}{2}$ to 3 lb. at six months old; the ewes 5 to 7 lb., and the shearling rams from 10 to 14 lb.

CROSSING.

The Dorset Horn Sheep has been crossed with the Southdown and Hampshire Down. For early lamb rearing the best cross is with a Southdown ram, as although the lambs may be a little smaller they are of better quality, whilst they fatten quicker, weigh better, and have shorter jackets than with other Down crosses. Dorset Horn rams have also been used on Hampshire Down and Devon Longwool ewes with great success.

The number of sheep registered in the Dorset Horn Flock Book for the year 1912, is ewes, 52,950; ewe tegs, 23,009; rams, 941.

There are two Societies in America, viz.: The Dorset Horn Sheep Breeders' Association of America, and the Continental Dorset Club. The former was established in 1891, and the latter in 1897, and there are upwards of 13,000 animals recorded in their books. The breed was first imported into America in 1887 by Mr. A. Thayer of New York, and Mr. E. F. Bowditch of Massachusetts; and Mr. T. S. Cooper, of Pennsylvania, the Secretary of the American Dorset Horn Sheep Breeders' Association, made a large importation in 1889. Canada was, however, in the field a little earlier than the United States, the breed being imported into Ontario in 1885.

The best known flocks in America at the present time, are the Tranquility Flock of New Jersey, The Fillmore Farms, Bennington, Vermont, U.S.A., Mr. Wing's of Ohio, Messrs. Gifford and Nash's of Indiana, Mr. Henderson's of Pennsylvania, Mr. Arbuckle's of Virginia, and Mr. Harding's of Ontario. There are also other flocks in Virginia and Georgia.

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Dorchester,
Dorset.

THE TREATMENT OF GRASS LAND WITH A VIEW TO THE ELIMINATION OF DISEASE.

THE selection of this title for an article to appear in the present issue of this Journal may, of itself, be taken as evidence of the importance with which the subject is generally regarded, and to some extent, suggestive of the difficulties surrounding it. A keen perception of the magnitude of the latter did not fail to arouse feelings of diffidence in acceding to the request to make the contribution, for while it was fully recognised that loss from disease amongst grazing animals is a very serious deterrent to profitable agriculture, which unfortunately the curative measures, now known, cannot be depended on to materially mitigate, the writer was fully conscious of the fact that elimination of disease by treatment of grass land involves consideration of many other matters than the application of material to the herbage or surface of the soil, which the superscription might suggest. Indeed, at the outset it must be confessed that our knowledge of the effects of such applications is so limited and lacking in precision that necessarily attention must be mainly directed to other aspects of the situation, as in the nature of things the elimination of disease must largely depend on prevention of its occurrence in animals, which provide the seeds and seed beds on which its existence depends.

There appears to be a general and growing impression that, apart from those scheduled under the Contagious Diseases (Animals) Act, diseases among grazing animals are becoming increasingly prevalent. For the foundation of precise opinion on this point no statistics are available, though it cannot be questioned that at the present time there is much more than formerly heard of losses limited and extensive. With falling prices of wheat has come the expansion of the area of more or less permanent pasture. Since 1882 the extent

of land under corn-crop has decreased by 2,000,000 acres, and that under roots by 400,000 acres, while that of "permanent pasture" has increased by about 3,000,000 acres, the number of cattle by 1,300,000 head, and of sheep by 2,000,000 head. Live stock has become the more important element in the consideration of British agriculturists, and this, in conjunction with increased facilities for dissemination of agricultural news, probably tends to bring under notice more than formerly the occurrence of disease in individual cases. The older literature of the subject is often misleading and does not always afford safe ground for comparison. For instance, Youatt, writing about seventy years ago on "The Sheep," refers to "consumption," "diarrhœa," and "dysentery" as responsible for serious losses in his day. More recently acquired knowledge, admitting of the study of diseases in relation to their causes, allows us to arrange them more precisely. To-day it is known that, while sheep are susceptible to tuberculosis, to which Youatt's description makes it clear he refers as "consumption," they are extremely rarely affected with it under the conditions in which they have always lived in this country. Excepting the "mysterious worm in the foot," the fluke and the gid-hydatid in the brain are the only worms to which reference is found in the index of this work; yet his description of symptoms, post-mortem appearances, and circumstances under which the diseases occurred make it fairly clear that all three conditions referred to under the foregoing names are now very common and known to be due respectively to worms in the lungs, stomach and intestines. There are, however, cogent reasons for thinking that altered management of our live stock consequent on change of circumstances has conduced to the more frequent occurrence of disease in serious form in animals on our grass lands, and, while to-day we may possibly encounter some diseases of animals unknown in this country a century ago, it is beyond doubt that the ploughing and cultivation of land have, in a general way, a purifying effect, and that the prolonged absence of animals must materially lessen the risk of its becoming contaminated and remaining so.

It is notorious that grazing animals are more liable to disease in some situations than in others. Fields and farms may acquire the reputation of being healthy or unhealthy to animals of one or more species. Holdings are advertised as "sound" or healthy for all or certain classes of stock and valued accordingly. From time immemorial it has been customary to associate certain diseases with certain grass lands, often under the conviction that such diseases are

products of the soil or that the cause is inherent to the situation. While, however, the stigma of being unhealthy or unsound may have rightly been attached to some pastures for generations, many instances could be cited in which the disease has ceased to appear in animals grazing in such situations, and there is ample evidence showing that some situations, which have for equal periods enjoyed a high character for freedom from disease of stock, have acquired an unenviable reputation in consequence of the appearance and recurrence of disease in animals grazing on them. There would appear to be a general impression that disease is more common in animals on old permanent than on new or temporary pastures, but we know that serious fatalities may and do occur on the latter. There is, however, reason for supposing that one of the consequences of extending the life of pasture may be increased liability of stock grazing on it to contract disease. Rich soil, which is the basis of rich pasture, and the ground on which much of it has become permanent, supplies, at any rate, one of the conditions favourable to, though not necessarily determining, the occurrence of disease, inasmuch as its plentiful supply of herbage admits of keeping large numbers of animals in relatively small areas, and so of increasing the risk of contamination. Low-lying, as compared with upland, pastures are often regarded as prone to disease partly for the last named reason, but mainly because conditions often obtaining in such situations are more congenial to the life and development of some disease-producing agents and so to recurrence of disease in serious form. It is highly important to recognise that the incidence and effect of disease on grazing animals may be materially influenced by situation and soil, but disease is limited to no kind of pasture, and is not a product of the soil or herbage in any other sense than cattle or sheep are. It is, of course, realised that the quality of pasture depends on the nature of the soil, situation, and the treatment applied to it, and that the highest degree of health in conjunction with rapid progress is favoured by feeding on herbage composed of plants known from experience to be best adapted to the requirements of animals of various species. Diseases to which attention will be directed are set up by living organisms, and, important as the foregoing circumstance may be, for our purpose it must be insisted on that they cannot be regarded as the cause of disease farther than they may provide conditions favourable to the contamination of grass land and animals with the living organisms severally capable of inducing the respective diseases. It is not proposed to refer to those disorders of live stock, which may result from the ingestion of herbage rendered harmful by inclusion of

poisonous plants, or toxic matters, such as lead, arsenic, &c., which are occasionally met with on grass land, nor such as depend on its abundance, succulence, dryness, or other such characters.

Considerations suggested by the title of this article are many and of wide range, and though there may exist some general principles, consistent with good agriculture, which should always be adopted and acted on, the primary and essential condition to be observed in attempting to eliminate diseases from grass land is the determination of the precise nature of the maladies it is desired to deal with, and it would prove a dangerous fallacy to regard disease as an entity, or to assume the existence of any panacea for the extirpation from grass land of all the diseases to which grazing animals are liable.

The living organisms, which commonly, though not exclusively, render grass land dangerous for stock are parasitic worms and bacteria. With the exception of a small number of the latter, such as those responsible for the production of black leg and tetanus, which are believed to live in the soil—soil organisms—the disease-producing organisms which contaminate our grass lands are derived from animals and are incapable of maintaining their power to harm live stock or, indeed, their existence for any great length of time apart from animals susceptible to the diseases of which they are respectively the causal agents. It is obligatory on the majority of these organisms to spend some portion of their lives in such animals, and if these are not available they perish. The length of the period during which disease germs are capable of maintaining their existence in the outer world, and so of continuing to contaminate pastures, can only be approximately measured. The spores of anthrax under certain conditions retain their vitality and efficiency for periods extending over several years, but this may be taken as the exception rather than the rule, and it will probably be safe to assume that in case of most of the specific diseases to which grazing animals are commonly subject, withdrawal of all live stock for a whole year would result in death of their causal germs and purification of the pasture.

Further, it is well established that while certain organisms induce disease in all live stock, others affect only animals of certain species. Advantage of this characteristic may be taken for the elimination of some diseases of the worst form. For instance, the small red bowel-worm, which pollutes many grass lands, and in some does serious harm to horses, affects animals of the equine species only, and residence in the horse or kindred animal being essential to its life, their exclusion

from the contaminated pastures removes the immediate danger, and prolonged absence leads to elimination of this form of contamination, and as this worm does not infest animals of other species, such may be grazed in the polluted situation without fear. This removal of the seed-bed is often the only practicable measure at our disposal for the elimination of diseases from grass land.

It would probably be incorrect to assume that, apart from their existence in animals, disease-producing organisms are ubiquitous or permanent residents on grass land; but it must be recognised that its disease-producing quality depends on its pollution with disease germs emanating from animals. These may be deposited directly by animals on to pasture, or be brought thither with food, manure, or other contaminated material. The degree and extent of contamination and the danger to animals grazing on them will materially depend on whether the seeds of disease are sparsely or profusely discharged during life by infested or infected animals—conditions applicable to the spread of disease generally. Take for contrasting examples anthrax and foot-and-mouth disease; in case of the former there is practically no discharge of the causal bacilli during life, or, at any rate, while the subject is moving about, and the number of animals dying at each outbreak averages less than two, the extensive fatalities which occasionally result from improper disposal of carcasses, &c., being included in the computation. In case of the latter, in which discharge of virus is profuse, if unrestrained, perhaps 60 to 80 per cent. of animals grazing with the affected one would contract the malady. These diseases may also be used to exemplify the varying periods during which grass land may remain contaminated. It has been stated that anthrax spores may retain their vitality in the outer world for years; it may be mentioned that in dealing with the outbreaks of foot-and-mouth disease which have occurred in Great Britain for many years, animals have been allowed to go on to pastures in which the affected had been grazing in about a month or six weeks after the existence of the disease had been reported, as far as we can discover, without recurrence in the same place.

The adoption of measures for the elimination of disease from grass land must be considered with the view of preventing its pollution, and destroying the organisms of which that pollution consists. In seeking for the sources of pollution it is essential to bear in mind that harmful parasites of various kinds are much more frequently than is ordinarily supposed resident, usually in small numbers, in apparently healthy animals, and these or their germs are discharged on to many pastures on which grazing animals remain unaffected by

recognisable disease, a circumstance due to the fact that the seeds are not available in numbers sufficient to induce appreciable symptoms, or that conditions in the outer world are inimical to their existence. This, perhaps, more generally applies to parasitic worms, for a striking difference between these and bacteria as disease-producing agents is that while the latter, after gaining the animal body, multiply so enormously that a minute dose may set up disease in fatal form, the development within the animal, of ova or embryos of worms produced there, to a stage at which they become injurious to the host does not usually occur. In case of neither is this rule absolute, for, small as the dose may appear, it is known that the effects of some bacteria depend materially on the number introduced into an animal in a given time ; while in the case of certain parasitic disease the principal mischief is produced in the animal by embryos expelled by mature worms within it. Inasmuch, therefore, as many apparently healthy animals are discharging germs, which in large numbers and under certain conditions may prove the cause of disease, it stands to reason that the thicker animals are on grass land the greater will be the risk of serious contamination, and in this lies the explanation of some of the ills of overstocking. Long before the existence of these conditions was generally realised, common observation had told our forefathers that frequent change and ample grazing space were essential to the health of live stock, particularly of sheep ; and the value of acting on their maxim is thoroughly supported by the revelations of modern research and experience.

Important, however, as is recognition of the fact that these diseases of grazing animals are caused by living organisms and that if these were not accessible to our live stock our pastures would, in this respect, be free from danger, it must be realised that conditions in the outer world favourable to their development are of extreme moment. Fortunately, only an infinitesimal proportion of disease germs cast forth on to grass land survive under conditions ordinarily obtaining in nature, but it is too well known that abnormalities of season and other circumstances, often beyond our control, may provide conditions under which they flourish and pollute grass land to a dangerous degree. Indeed, while it is impossible to determine whether any given animals are or are not discharging disease germs, it would appear that the means at our disposal are insufficient to ensure complete security against occasional dangerous contamination. It will be realised that the seeds of disease may be brought by animals into situations in which the disease for which they are responsible had not been previously known to exist, and, if favourable

conditions obtain, may become a source of pollution of pastures and stock. It is, therefore, in this relation advisable to introduce only animals from uncontaminated sources; but while the attainment would be ideal, it is to be feared that no such assurance is to be acquired, and that in the purchase of fresh animals some degree of risk must be accepted.

As most of the diseases to which live stock are liable occur in animals at grass, it will be evident that limitations of space will admit of but cursory treatment of the subject, and all that can be attempted is a glance at what we regard some of the more salient features in certain of its aspects.

The contamination of grass land, which is frequently referred to as "soiled," "tainted," or "sick," has, owing to heavy losses of stock, particularly of sheep, at pasture, been much under consideration for the past quarter of a century. As the terms imply, the condition occurs where large numbers of animals have been more or less continuously grazed for prolonged periods in relatively small areas. It would appear that the expressions are not infrequently employed to convey the idea that the unhealthiness of the pastures and unthriftiness and disease of animals grazed on it are directly due to the nature and quality of the herbage produced under the foregoing circumstances. Indeed, one has often heard expressed the belief that the chemical constitution or physical state of the grass is at fault, and that it lacks some of the elements essential to the physiological requirements of animals of the class for which a pasture is said to be "sick," and so is the direct cause of "pining and sickness." The feeding qualities of grass land, it must be allowed, may be rendered more or less appropriate by treatment depending on the habits of various species of animals or by its management, but we know of no solid reason for thinking that the composition of grass can be so altered by any form of treatment as to render it, of itself, capable of inducing disease. The "sickness" of pasture is usually, if not exclusively, due to its pollution by some living germs of disease emanating from animals. In our experience the "tainting" of grass land is most commonly met with under circumstances known to be favourable to the existence of parasitic worms on pastures, and in the investigation of illnesses and fatalities among grazing animals on land said to be "sheep sick," "horse sick," &c., such occurrences have been most frequently found due to the attack of parasitic worms. The adoption of measures for the elimination of such diseases must be influenced by consideration of points in the life histories, as far as they are known, of the parasites which cause them. The contamination may consist solely or mainly of parasites of one or more species or variety. It is a common

occurrence to find worms of two distinct kinds infesting the lungs, and even a greater variety in the stomach and intestines of sheep, each inducing morbid changes in the situation in which it is found and adding its quota to what is often a fatal termination.

Discovery of the source of contamination of our grass lands with parasites' worms is a matter of importance. While it may not be correct to assume that parasitic worms are permanent residents on all pastures, it must be borne in mind that a large proportion of apparently healthy sheep harbour a few worms of different species, and their natural habitat in the mature form is within animals susceptible to their injurious effects. Here reproduction takes place, and eggs or embryos are produced, which, on being discharged by grazing animals, constitute one of the forms of contamination most common and serious in this country. Indeed, residence within the susceptible animal is essential for maintaining the various species of disease-producing worms. The impregnated female or female portions of hermaphrodite worms produce immense numbers of eggs or embryos, the great majority of which, under conditions usually prevailing, perish soon after gaining the pastures. Were this not the case, parasitic disease would be far more prevalent than it is, if any live stock remained to be attacked. It can be but occasionally that very favourable conditions for the development of these seeds of disease in harmful proportions obtain in the outer world.

In case of some of these parasites the development from egg or embryo, in which form they are cast out by infested animals, to that in which they are capable of living and doing harm to live stock takes place in a short time and under simple conditions, and probably moisture and a temperature such as usually obtains in summer months in this country are the only essentials. Of other species it is known that, in order to attain the harmful stage, the immature worm must spend some period of residence in some small creature—its “intermediary host.” If such is not available to the larval form, it dies. In attempting to eliminate some disease from grass land it is important to take this into our calculations, as it may be possible to avert dangerous contamination by providing conditions unfavourable to the existence of the intermediary host, when circumstances affecting the parasite in its other stages may be beyond our control. Advice to keep live stock on pastures on which there was no surface water during the past summer would not have been very highly appreciated. It will, indeed, be realised that while apparently healthy animals harbour parasites, which cast off vast numbers of their progeny, the occurrence of disease in grazing animals will often depend

on conditions which cannot be wholly averted. Whether these disease germs shall exist in numbers, sufficient to seriously infest, may possibly to some extent depend on management, but while this may sometimes minimise the contamination of the land and the risks of serious infestation, it is to be feared that at present we are not in possession of knowledge sufficient to ensure perfect purity of our pastures. Unfortunately we are unable to determine that any given area of grass land is polluted until its effects are manifested by disease in animals grazing on it, and in case of most diseases due to parasitic worms before there is any distinct manifestation considerable numbers of animals have already become seriously infested and further pollution is proceeding. It must be remembered that such disease may not have been acquired in the situation in which it is manifested.

It is much to be regretted that we possess so little precise knowledge of the life history of many of the parasitic worms harmful to live stock. The immense aggregate loss attributable to their action, which might possibly be averted by discovery of the conditions essential to their existence in animals and on pastures by suggesting appropriate means for breaking their life cycles and purifying pastures, calls loudly for further research, and we venture to express the view that to few more desirable objects could portions of the Development Fund, allocated to improvement of the conditions on which agriculture is carried on, be applied.

A forceful example of the value of scientific research in this direction is supplied in the Report¹ by Mr. A. P. Thomas of his investigations resulting in discoveries which completed our knowledge of the development of the fluke, the cause of liver-rot, which thirty years ago decimated our flocks, but with the ravages of which we are happily less familiar to-day. It has been recognised that this parasite, after entering sheep, cattle, and other animals in an immature form, gains the bile ducts of the liver, setting up in this organ and elsewhere disease, which baffles all attempts at cure, and emitting innumerable eggs which are discharged with the faeces of infested animals. It was demonstrated that, for the first stages of development of the egg, moisture and some degree of heat are essential. If these conditions exist on the spot in which an egg is deposited, development may proceed to the stage at which the immature parasite enters the body of a certain fresh-water snail in which a period must be passed before it becomes capable of infesting its ultimate hosts, the sheep, &c. If this fresh-water snail is not available the fluke embryo perishes.

¹ R.A.S.E. Journal, Vols. 42, 43, 44,

The elimination of this disease from grass land may with this knowledge be attempted on precise lines directed to breaking the life cycle of the parasite, which may under some circumstances be accomplished by not grazing sheep and other susceptible animals on pastures on which surface water accumulates or stagnant pools exist, or by the application of salt to the surface with a view of establishing conditions inimical to fresh-water snails. Our recent weather experiences prove the futility of attempting the former during the past season. Another instance in which a complete knowledge of the life-history of a parasitic worm permits of the adoption of precise measures for the prevention or elimination of disease from grass land is the case of the affection familiarly known as gid, sturdy, turnsick, &c. This disease, which affects animals of various species, but, in particular, sheep and lambs, is induced by the pressure of a bladder or "hydatid" in the brain or spinal cord. Though usually met with in only a small number of animals in a flock, our pastures may be so contaminated with the eggs of the tapeworm, of whose existence this bladder represents one phase, that 25 per cent. or even a larger proportion of the lambs grazing on it may succumb to attack. The tapeworm, whose eggs are taken from the contaminated pasture by sheep, is in its mature form an inhabitant of the intestine of the dog by which its eggs are deposited on pastures. The eggs ingested by sheep and other stock pass to the brain and develop into the bladder, which contains hundreds of heads, each of which on being eaten by the dog may develop into a mature tapeworm. This form of contamination may be averted by preventing dogs from eating heads of affected animals unless they have been previously boiled so as to kill the tapeworm heads within the bladder; or by bringing dogs, liable to go on to the grass land, within an enclosed space, dosing them with medicine for the expulsion of tapeworm, and destroying their excreta.

It may be remarked that in regard to elimination of disease due to tapeworms and long round worms (*Ascarides*), we enjoy a special advantage in possessing a reliable means of causing expulsion of the injurious parasites from infested animals. Occasionally animals on our grass lands become somewhat severely infested with tapeworm or ascarides and our pastures much polluted by their ova. Severe losses among lambs and young horses from these causes have come within our observation. The treatment of pasture with the view of eliminating these forms of disease is best effected by placing the animals harbouring the worms on to land about to be ploughed and to administer appropriate drugs for the expulsion of the worms and their eggs, which probably perish after being ploughed in.

When we come to consider the adoption of measures for the elimination of disease due to parasitic worms from grass land, which we have stated should, as far as practicable, be based on a knowledge of the life history of the respective parasites, it has to be admitted that concerning many of those which pollute our pastures and cause extensive loss to stock owners, comparatively little is known as the result of experimental enquiry. It is, however, recognised that, following certain conditions in the outer world, it is common to find animals infested with worms of various species, and for parasitic worm disease due to different kinds of worms to appear in the same situations and in certain seasons. From these observations it is inferred that certain circumstances are favourable to the development of some species of worms, whose life history has not been completely determined by special investigation. Generally speaking, stagnant surface water, dirty ponds and drinking water, tufts of long coarse grass, and overstocking, which necessitates continuous grazing of animals of the same species in comparatively small areas, are regarded as favourable to the occurrence of destructive parasitic worm disease, and should, as far as possible, be avoided, more particularly in the spring and summer months, when the temperature probably supplies one of the essential conditions. It is realised that such advice is often easier given than carried out, wet seasons placing its adoption beyond our control.

When practicable, advantage should be taken of knowledge as to the susceptibilities of species of animals to the ill effects of the several parasitic worms, and, as before indicated, animals of susceptible species should not graze on pastures suspected of being contaminated with parasites special to the species. The case of the small red bowel worm of the horse has been instanced in relation to this point, which may be further exemplified by reference to that of a very destructive worm, *Strongylus rufescens*, which infests the lungs of sheep and is probably a common source of pollution of grass land, as in some phases of its development it is found in a large proportion of our apparently healthy sheep. This worm does not affect other farm animals, and, as far as has been ascertained, does not retain its vitality for long periods apart from sheep. The exclusion of sheep from a pasture for a year would probably be a means of purifying it, but, of course, after the return of infested sheep it may soon become again polluted.

It is believed with some reason that while adult animals may harbour considerable numbers of parasitic worms without appreciable harm, young animals are much more readily affected, and on this ground it is deemed advisable to graze young before and not after older animals. A further explanation

lies in the fact that the older animals contaminate pastures by the deposition of ova or embryos of worms which naturally inhabit their internal organs.

It has to be admitted that in the majority of cases, when our live stock are so heavily infested with parasitic worms as to show definite symptoms of disease, remedial measures are not usually effectual. Experiments in the laboratory as to the effect of medicines in general use for the death or expulsion of worms do not favour the view that they are easily killed by these agents at a strength compatible with the health and life of animals in which worms exist. It would appear that before the existence of the disease is manifested by distinctive symptoms, the damage done is often beyond any repair we can fairly expect from the use of drugs, whose action is now known to us. It is within the range of possibility that in case of apparently healthy animals harbouring a few parasites the administration of certain medicines may render conditions within the animals uncongenial to worms and effect their expulsion ; and in situations in which it is known that worm disease is liable to prevail it may be advisable to administer some worm medicine to animals in the spring and early summer, after doing so placing them on land which is to be ploughed. The use of rock-salt, and salt mixed with trough food is possibly beneficial.

Much has been written and said as to the benefits likely to accrue from the application of agents such as lime, salt, soot, &c., to contaminated grass land with the object of purifying it from disease, while it is claimed by some commercially interested in artificial manures that some of these are effective. Laboratory experiences do not indicate that lime, salt, or soot applied in such amounts as are compatible with the life and well doing of herbage and live stock are likely to destroy all the disease-producing agents polluting grass land, but as instanced in case of the effect of salt on the fresh-water snail, which entertains the immature fluke, it is, perhaps, possible that either or all of the materials named may provide circumstances unfavourable to parasites in some phase of their development. The effect of lime on soil, we know, is sometimes remarkable. Our knowledge of its deleterious effect on soil bacteria is far from complete, but it has been seriously suggested very recently that it is capable of effecting some measure of soil-sterilisation. While the addition of lime to many soils is so often followed by growth of superior herbage, its application to "tainted" pasture may be advisable, though in our present state of knowledge we cannot suggest that it should take the place of other measures named, but used in conjunction with them at the rate of 2 or 3 ton of slaked lime

to the acre. We have no knowledge of the special effect of any chemical manure on the organisms which pollute pastures, but when it is realised that grass land may be contaminated by organisms discharged in the excreta of infested animals, it will be evident that most of the chemically prepared manures are far less likely to convey the seeds of disease than animal manure. It will be realised that top-dressing of grass land with farmyard manure made by animals discharging disease germs may prove a facile means of rendering it dangerous to grazing animals.

The treatment of grass lands most likely to prove effective for the elimination of parasitic worm disease is ploughing; few, if any, of the eggs or embryos, we think, long survive their burial in this way, while the absence of animals would ensure it against fresh pollution. It is, however, questionable whether the effects of ploughing are sufficiently enduring to warrant its adoption in case of grass land which, except for the existence of disease caused by parasitic worms, is more valuable as pasture than as cultivated land. There must always be the risk of pollution by deposit of ova or embryos as soon as such land is again laid down to grass, and stocked.

Contamination of grass land is not, however, limited to disease induced by parasitic worms. Grazing stock are liable to acquire bacterial and other maladies from polluted herbage, water, &c., and these are so numerous that but very cursory reference can be made to some more salient features of a few, and this mainly with a view of indicating that attempts at elimination must be governed by the special features of each form of contamination. As in the case of parasitic worms, the great majority of bacteria must spend some part of their existence in animals, and do not retain their disease-producing powers long apart from them. They live in the outer world for varying periods, but most of them succumb to natural conditions soon after being discharged from the affected animal, sunlight being a potent factor in their destruction. The temperature usually obtaining in our climate does not favour their multiplication outside the animal body. It is within the infested animal that their increase takes place after varying periods of incubation, and though to some extent the effect will depend on the number entering an animal, a very small dose is usually sufficient to produce the full effect. Some are discharged during illness of affected animals and scattered over pastures; others are mainly confined to the animal, and, for pollution of grass land, derived from affected carcasses. The effects of some bacteria are also limited to animals of certain species.

In the case of some of these organisms, residence in a susceptible animal is not regarded as a condition essential to life and increase. It is probable that under ordinary conditions such soil-organisms rarely contaminate grass land in a highly dangerous degree, but this may occur when carcasses of their victims, which contain the germs of the disease, are allowed to remain long on pastures or are otherwise improperly disposed of. For example, it is well known that black quarter was specially liable to occur among young cattle grazing in the same situation year after year, sometimes causing serious loss, and it was so far recognised that there was little hope of eliminating the risks of its occurrence by treatment of pastures or of curing the affected that such supposed preventive measures as setoning, rowelling, and inoculation were resorted to. While we may possess no means for extirpating all such disease germs from the soil, experience indicates that proper disposal of diseased carcasses practically reduces to a minimum the risks of occurrence of diseases due to them, as during illness they are not usually discharged on to the land.

Anthrax, which includes amongst its subjects farm animals of all species, is usually regarded as a disease often due to contamination of pasture and very liable to recur on certain grass lands. In countries in which the temperature is normally high for considerable portions of the year and other conditions in the outer world favourable, the germs of this disease may multiply, but under conditions ordinarily obtaining in these islands, this probably but rarely occurs outside the bodies of affected animals. Though during the late stages of illness of the animal some anthrax bacilli may be discharged, such discharge is usually not profuse, and as the course of the disease is very short, grass land is not likely to be widely contaminated by the living animal. Indeed, the recurrence of anthrax in the same situation as a result of contamination of pasture would, from the investigation of a large number of so-called "outbreaks" by the Board of Agriculture, appear to be far less common than was formerly believed, while the fact that on the average less than two animals die at each outbreak gives strong support to the same view. There are, however, some situations in which anthrax recurs periodically. Such may depend on the fact that if the long rode-like anthrax organisms or bacilli in which form the germs exist in the affected animal are exposed to the air they produce spores, which are capable under some circumstances of retaining their vitality and efficiency in the outer world for periods which may extend over years. Some grass lands are also more open to the risks of fresh contamination as a result of proximity to or connection with woollen, alpaca, or hide

factories, &c., while in the present day grazing animals are believed to contract this malady from eating foreign-grown artificial food, and from pastures treated with certain raw-bone manures. In considering the treatment of grass land with the view of elimination of anthrax the foregoing must be provided for, but the recurrence of this disease on our pastures mainly depends on improper disposal of carcasses and dejecta of its victims, and if the conditions prescribed by law are observed, there are few risks of pollution of pastures. As all kinds of farm animals are susceptible to this disease it is not practicable to attempt its elimination by withdrawing those of any particular species, while ploughing might act deleteriously by bringing buried spores to the surface. Its fatal nature and communicability to man add a degree of seriousness to its occurrence, but when it is realised that of nearly 40,000,000 grazing animals in this country the total annual number of deaths attributed to anthrax is about 1,000, of which a considerable proportion occur in stabled animals, it must be concluded that it is not a common or widespread form of contamination of pastures, and though under certain conditions anthrax spores may retain their vitality for years, exposure to the rays of the sun for a few hours kills them.

Johne's Disease, an old acquaintance, which under a new name looms somewhat largely in the public mind as a disease affecting cattle, sheep, and some other ruminants, affords an example of an affection in which large numbers of the causal germs are discharged with the fæces of affected animals and with which grass land may therefore become polluted. It also occurs in stall-fed cattle, and manure made by them must be regarded as infective. Though the micro-organisms giving rise to this malady have retained their vitality for considerable periods in the laboratory, little of a precise nature is known as to how long they may remain dangerous on pasture, or of the effect of the application of any material to its surface. The means of eliminating the risks of contamination must be sought for in preventing affected animals from depositing the causal bacilli on our grass land. Animals become infected by ingesting these micro-organisms, but the progress of the disease is slow, and for a considerable period after the germs have been taken in with food or water no distinctive symptoms are shown, and with ordinary observation it is not possible to diagnose its existence in the early stages when perhaps but few germs are being passed. To avert contamination of grass land it is desirable under all circumstances to remove affected animals, isolate them, and to prevent manure made by them from being spread on grass land. It would be of supreme advantage to be able to discover the infected animal before the

disease has advanced to the stage at which its germs were being discharged in profusion. Quite recently the preparation of a specific diagnostic vaccine has been announced by Messrs. Twort, M.R.C.S., and Ingram, M.R.C.V.S., of the Brown Institution, London, for which is claimed the power to diagnose the disease in its early stages. If this, or any like means, should prove effectual and practicable in the field there will be at our disposal a highly valuable form of treatment for averting pollution of grass land, and so of eliminating this serious malady to which our more numerous grazing animals are liable.

Contagious abortion of cows is probably sometimes contracted on pasture as a result of its contamination by the abortion, discharges from the womb, &c. It is now known that infection may take place by ingesting the germs of the disease, and, while attention must be paid to disinfection of the fœtus and any discharge which may be discovered, the elimination of this malady from grass land is surely effected by excluding female bovines, its only subjects, for lengthened periods.

Recent reports as to the danger from discharge of tubercle bacilli in the faces of tuberculous cattle would naturally suggest tuberculosis as being another serious form of contamination of grass land, but, though it may not be denied that it is possible for healthy animals to contract the disease on pasture, many circumstances indicate that such is not by any means the ordinary situation in which the germs of this affection are acquired. Sheep which so frequently graze with and after cattle, though quite susceptible, are extremely rarely affected, a remark which largely applies to grazing cattle, which have never been housed.

As suggestive of the variety of the measures to be adopted for the elimination of disease from grass land, reference may be made to the affection of cattle known as Red-water, which occurs persistently on certain pastures, usually, though by no means exclusively, of rather inferior quality. Until recently this disease was attributed to defective nutritive quality of herbage, but revelation of its true nature shows it to be caused by micro-parasites (piroplasms) introduced through the skin into the blood by ticks which contaminate the grass land in which the disease is contracted. For our purpose it is highly important to recognise the fact that the disease producing piroplasms which the tick inoculates have been derived from the blood of infected animals. It is taken that ticks are essential to the production of this disease, and, that if no ticks were available there would be no Red-water. To purify the pasture it is desirable to adopt all practicable

measures for the destruction of these creatures. Arsenic applied to the skin of infested cattle, burning of tufts of coarse grass, &c., which afford suitable breeding ground for ticks are often suggested for this purpose, but, though considerable reduction of their numbers may be effected, the annihilation of the species by such means is not easily accomplished. It is believed that residence on cattle or equines is essential to the life of these ticks, so that keeping grass land free from these animals for a year, or less, would probably mean death to ticks from starvation and freedom of the animals grazing on the pasture from Red-water.

Of other forms of pollution to which grass land is subject *foot-rot* of sheep affords a very familiar example. The precise nature of the agent which brings about the pathological changes in the horn of the hoof is, perhaps, not determined, indeed, it may be that organisms of more than one variety are responsible for these changes, and the almost ubiquitous appearance of the disease certainly suggests that the causal factor is widely distributed on our grass lands. Experience of the conditions under which large numbers of sheep in a flock become affected with this troublesome complaint indicates that these are such as tend to soften the horn and prevent that wearing of the ground surface of the wall which keeps the hoof in proper proportion. The vulnerability of the horn and its over-growth thus established are probably more important considerations than that of the micro-organisms which actually invade and disorganise the horn and expose the underlying sensitive structures of the foot to painful impressions. As grass and grass land is wet and soft sheep grazing on it are liable to become the subjects of this disease. In most cases these circumstances cannot be altered, and the most that can be done to cope with them is to select the driest situations available, while this form of contamination is more likely to be counteracted, if not eliminated, by attention to the sheep's feet than to any treatment applied to grass or grass land.

It is, of course, possible that disease germs may be transported by many and various agencies other than directly by diseased animals, and after gaining grass-land set up in animals there diseases of a more or less enduring nature. An element of risk must always be associated with foreign feeding stuffs, mill sweepings, raw animal manures, road sweepings, &c.

Though but the fringe of this important subject has been touched on, and that in a fragmentary manner, it is hoped enough has been disclosed to indicate that disease of grazing animals is not an entity which can be eradicated by one universal measure; that grass land is liable to contamination with the seeds of many diseases for the extirpation of which

there is no panacea yet discovered, and that after determination of the nature of the contamination it is desired to eliminate, such treatment should be adopted as is specially appropriate and applicable. Each form of contamination must be treated on its merits, and success of treatment will largely depend on the information possessed as to the history and habits of, and the circumstances affecting, the several organisms which constitute the contamination and are respectively responsible for the occurrence of various forms of disease in grazing animals. Regrettable incompleteness of our knowledge of the conditions affecting the life and development of some of the more dangerous organisms which pollute our pastures stands in the way of the application of precise measures for their destruction, while it is realised that some of the circumstances under which contamination may occur are beyond our control.

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FOOT-AND-MOUTH DISEASE.

History of the Disease in Great Britain.—Although there is good reason to believe that foot-and-mouth disease was unknown in this country before the last century, it probably has existed from time immemorial in Asia, and it appears to have prevailed at intervals in the epizootic form in Eastern Europe before its introduction into Great Britain. Thus, in the sixteenth century it was described by Italian writers, and in 1686 and 1687 it spread over Germany and France. In the following century it had a wide distribution over the Continent of Europe, and numerous outbreaks of it are recorded. In the early part of the last century it was equally prevalent in Eastern and Middle Europe, but it was not until 1839 that the disease obtained a footing in Great Britain. The precise circumstances of its introduction here are not known, but during that year it speedily acquired epizootic dimensions among British cattle. The earliest reference to it in veterinary literature is found in the *Veterinarian* for 1839, where, under the heading “The present Epidemic among Cattle,” Mr. Hill, a veterinary surgeon of Islington Green, described an outbreak in a dairy of 700 cows. Six of the cows were suddenly attacked “with a singular disease, the symptoms of which were precisely the same in each. The lining membrane of the whole of the mouth was in a state of inflammation and vesication. The tongue was

involved, but the most extensive and annoying vesication was between the under lip and the gums. In two of the six it extended over the muzzle to the nostrils . . . and peculiar symptoms accompanied this—a continual catching up and shaking of one or other of the hind legs.” These symptoms were at first attributed to some poisonous herbage ; but that the disease was epizootic was soon made manifest, for in the course of about ten days more than 500 of the cows had been attacked.

Succeeding numbers of the *Veterinarian* contain other reports regarding the “epidemic,” the contagious character of which was recognised, although the possibility of its originating under “atmospheric agency” was entertained by many veterinary surgeons. Indeed, as late as 1857, Professor Simonds denied that foot-and-mouth disease was imported ; and for many years afterwards this opinion was used to combat the efforts of those who held that the disease never originated spontaneously and ought to be opposed by measures calculated to stamp it out.

From the period of its introduction till 1866 foot-and-mouth disease was never absent from Great Britain ; but by the end of the latter year, apparently owing to the operation of the measures directed against cattle plague, this country was nearly free from the disease. The next few years, however, saw an alarming recrudescence of the plague ; and in 1870 and 1871 over a million animals were reported to have been attacked by it. The Contagious Diseases (Animals) Act came into force in 1878, and the repressive measures which it introduced had almost eradicated foot-and-mouth disease by the end of the following year. Unfortunately, during 1880 it again began to spread, and in 1883 it affected nearly half a million animals. After that date it gradually declined, until in 1886 only one outbreak was reported. For the following six years the British Islands were free from foot-and-mouth disease ; but in February, 1892, the disease was discovered among some Danish oxen in the Metropolitan Cattle Market. Notwithstanding the utmost vigilance of the Board of Agriculture, this proved the starting point of an epizootic during which, in England and Scotland, 5,267 animals were attacked. Rigorous isolation, supplemented in some cases by slaughter of the affected animals and of those that had been exposed to the contagion, had the effect of exterminating the disease by June, 1892.

Since 1892 the importation of live cattle from countries in which foot-and-mouth disease exists has been prohibited, but nevertheless since that date the country has frequently been invaded by the disease. On January 1, 1893, it

appeared in a London cowhouse, and six weeks later it was detected on a farm near Hastings. The first of these outbreaks was suppressed by prompt slaughter of all the cattle on the premises, and in the second outbreak isolation was successfully employed to prevent the spread of the disease. The disease re-appeared in 1894, but it was limited to three outbreaks. During the following five years the country was free from the disease, but it broke out again in January, 1900, and between that date and April, 1901, thirty-three outbreaks, with 935 animals attacked, occurred. In the following year there was only one outbreak, and as that occurred at a short distance from the scene of an outbreak in the previous year it is possible that the infection in this case may have persisted, and that the outbreak did not originate from the fresh introduction of the virus. During the period 1903 to 1907 no outbreak was recorded in Great Britain, but in 1908 the disease re-appeared in Scotland (Midlothian), in which country there had been no outbreak for fifteen years previously. It was stamped out after it had extended to three different premises, and the country was again free until 1910, in which year two outbreaks occurred in the West Riding of Yorkshire. The disease re-appeared in 1911, breaking out in five different English counties, and extending to nineteen different premises.

After six months of apparent freedom from the disease four outbreaks were detected in the week ended June 29, 1912, viz., two in Cumberland and two in Lancaster. Between that date and December 7 seventy-nine outbreaks were discovered in different parts of the country, the counties involved in addition to the two mentioned being Chester, Durham, Northumberland, Surrey, East and West Ridings of Yorkshire. Leicester, Somerset, Salop, Sussex, Stafford, Kent, and Hants. In these eighty-three outbreaks 645 animals were attacked.

It cannot be said that the exact source of the infection has been determined in any of these numerous occasions on which the disease has been introduced since the importation of live cattle, except for slaughter at the port of landing, has been prohibited, although in the case of the Midlothian outbreak in 1908 circumstances seemed to incriminate imported foreign hay. It is obvious, however, that whenever the disease is very prevalent in Continental countries which have extensive traffic with Great Britain there is a possibility that the virus of the disease, adhering to human beings or inanimate objects, may be imported, and in this connection it is a noteworthy fact that the disease has most frequently made its appearance in Great Britain when it has been very prevalent in Germany, Holland, France, or Belgium. Moreover, Denmark although isolated from the Continent has had an experience

very similar to that of Great Britain. Both in this country and in Denmark the disease has on various occasions broken out in places not far from the coast, and the fact has led to the surmise that the virus may be introduced with birds which have crossed the North Sea. Quite recently an opinion

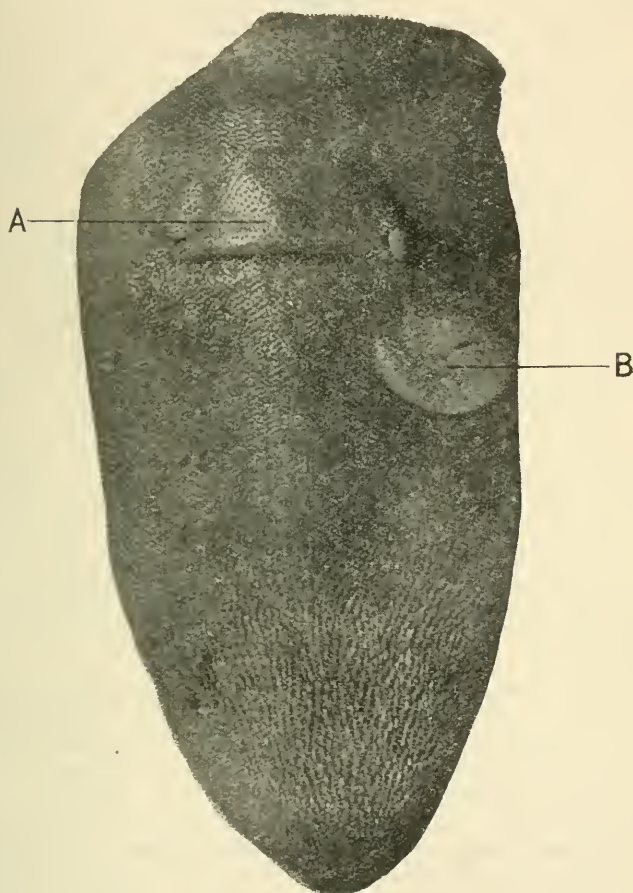


FIG. 1.—A and B, two large vesicles on the tongue which were unruptured at the time when the animal was killed.

held by some of the older writers on the subject, has been revived, viz., that the virus may actually be carried for many miles in the atmosphere. Although it may be unjustifiable to deny this possibility, it must be admitted that the numerous occasions on which in this and other countries outbreaks have

been successfully dealt with by isolation would appear to warrant the conclusion that the disease is seldom air-borne for long distances.

The Cause of the Disease.—At the present day every intelligent educated person is ready to admit that all contagious and infectious diseases are caused by living things which possess the power of multiplying within the bodies of the men or animals attacked. No other assumption than that the cause is a living thing—belonging either to the animal or the vegetable kingdom—would afford a reasonable explanation of the fact that the cause increases in amount, often enormously, in the body of an individual suffering from a contagious disease.

In the case of many contagious diseases the actual thing which is the cause of the mischief has been identified, and the part which it plays proved beyond any doubt. That is true of anthrax, glanders, and tuberculosis, to mention only a few well-known diseases. In anthrax, for example, the cause is a vegetable germ or bacterium which a good modern microscope can make distinctly visible to the human eye in the blood or other constituents of the body of a diseased animal. That these so-called anthrax bacilli are the actual cause of the disease can be proved by growing successive crops of them in test-tubes, and showing that when a few of these artificially cultivated germs are inoculated or otherwise introduced into the body of a susceptible animal, such as an ox or sheep, it becomes infected with anthrax, and that the blood of the animal thus experimentally infected when submitted to microscopic examination contains inconceivable numbers of bacilli identical with the few that were intentionally introduced into its body.

The causal connection between the bacillus of anthrax and the disease of the same name is easily proved, because this particular organism is of comparatively large size, easily cultivated outside the body, and generally very abundant in the blood of infected animals at the time of death.

In many other diseases of which the germ or bacterium is now definitely known much greater difficulty was encountered in providing the evidence necessary to prove the connection, such difficulty generally depending on the very minute size of the organism, or on the difficulty of growing it outside the body. Pleuro-pneumonia of cattle is an example. In this case the evidence necessary to secure a verdict against a particular microbe has been obtained, and it is now generally accepted that the disease is caused by an organism which the most powerful modern microscope can only make visible to the human eye as a mere point. This case is instructive. (1)

because the germ in question is difficult to grow outside the body, and (2) because if it had been one half smaller than it actually is its discovery, in the sense of being able to see it, would have been impossible.



FIG. 2.—Showing near the tip of the tongue a circular sore left after bursting of a vesicle. The sore is in process of healing.

A priori reasoning might thus have led to the conclusion that in all probability some germs or bacteria are too small to be made visible to the eye of man, and at the present time it is actually assumed that the causes of some diseases, although living things which grow and multiply, have escaped detection because they lie beyond the limits of visibility. Foot-and-mouth disease is one of these diseases, and the belief that its cause is an invisible germ is founded on the following facts. The thing which is the cause of foot-and-mouth disease is present in the nearly clear watery liquid of the vesicles or blister-like lesions which are formed in the mouth during the course of an attack. That is proved by the fact that this liquid can be successfully employed to infect an animal with the disease. Furthermore, the cause is abundantly present in the liquid, for it has been found (Loeffler) that $\frac{1}{100000}$ part of a cubic centimetre of it will infect an ox when injected into a vein.

Liquid which can thus be proved to contain what is conveniently called the virus of the disease may show no bacteria or other solid particles when examined under the highest powers of a good microscope, and when it is taken from a freshly formed vesicle with the precautions necessary to prevent the admission of accidental bacteria from the mouth no bacteria can be cultivated from it. Finally, when the diluted liquid from a mouth vesicle is passed through a filter proved to be quite efficient for arresting the smallest visible bacteria it is still capable of infecting an ox or other animal susceptible to foot-and-mouth disease—a result which can only be explained by supposing that although the pores of the filter are small enough to stop minute but visible bacteria they are large enough to permit the microbes of foot-and-mouth disease to pass through them.

Such is the evidence upon which it has been generally accepted by bacteriologists that, just as in other contagious diseases, the cause of foot-and-mouth disease is a living microbe, but that it is too small to be recognisable with the eye. And it ought to be observed that in all probability failure to detect this microbe is not a mere temporary disability likely to be overcome by improvements in microscopes, for there are physical limitations to the minuteness of particles that can be made visible to the human eye.

Although it is thus possible to account satisfactorily for the fact that the individual foot-and-mouth disease microbes have not been seen, it is not so easy to understand why all attempts to grow these microbes outside the body have failed. It is obvious that, however minute individual living things may be, if they can be induced to multiply on the surface of some solid substance outside the body they must eventually form a visible growth. For example, a single anthrax bacillus in the course of twelve hours will build up a mass of growth plainly visible to the naked eye, and although a longer time is often required the result is the same with nearly all the known visible bacteria. It is a curious fact, however, that it has not yet proved possible to induce any of the so-called invisible organisms to multiply outside the body, a fact which has led some authorities to think that these minute living things may not be bacteria (which belong to the vegetable kingdom) but protozoa, or animal parasites, similar to but smaller than those which are the cause of human malaria and redwater in cattle, for these, although visible, have resisted all attempts to cultivate them under artificial conditions. There is, however, no disease known to be caused by protozoa which is so intensely contagious as foot-and-mouth disease, and upon the whole it appears to be probable that the invisible microbe of the latter is a bacterium.

The bacteria which are the cause of disease fall quite naturally into two classes, the first including those which are able to lead a double existence, multiplying either outside the body, in soil or water, for example, or in the bodies of animals; and the second including those which in natural circumstances multiply only in the bodies of animals. There can be no doubt that the virus of foot-and-mouth disease belongs to the second of these groups, for in view of the fact that it has resisted all attempts to cultivate it artificially, that is to say outside the body, one cannot believe that when voided from a diseased animal it ever multiplies in soil, water, or excrement. The point is important, because it carries with it the conclusion that no animal ever becomes infected with foot-and-mouth disease except when it takes into its system germs that have been bred in the body of another previously infected animal.

It must be observed, however, that bacteria which are denied the power of multiplying in the outer world may nevertheless be able to *survive* for a time outside the body, and some of the strictly parasitic organisms possess great powers of resistance in this way. Fortunately there are good reasons for believing that when the virus of foot-and-mouth disease escapes from a diseased animal it nearly always succumbs within a comparatively short period, sunlight and the drying effect of the air being probably the most important agents in bringing about its destruction.

There is a very large experience to show that in fields, and even in houses as a rule, the virus dies out in a few weeks, but it ought not to be forgotten that the virus has been kept alive in hermetically sealed glass tubes for nine weeks (Loeffler & Frosch). Moreover, certain observations that have been made regarding the recurrence of outbreaks on the same farm suggest that the virus may retain its vitality in hay or manure for many months or even for a year.¹

Susceptibility and Method of Infection.—Cattle, sheep, goats and swine are the animals most frequently affected with foot-and-mouth disease, and man is occasionally a victim of the disease. Alleged cases of the disease in horses, dogs, and fowls, have been recorded by veterinary authors, but in many of these a possibility of error in diagnosis must be admitted. In this connection it is noteworthy that no case of the disease in any of these last-mentioned species has been observed in this country.

The channel by which the virus usually enters the body in natural cases of infection is not known with certainty. It cannot be doubted that infection by the mouth is common, but the readiness with which the disease is contracted during

¹ Bang: *Journal of Comp. Path. and Therap.*, Vol. xxv., page 8.

contact in markets, &c., even when neither food nor water has been taken, makes it very probable that the virus may be effective when inhaled.



FIG. 3.—A A, two recent sores left by bursting of vesicles on the tongue.

The most certain method of experimental infection is the injection of the virus into a vein. Rubbing saliva from a

diseased animal into the lining membrane of the mouth is also very effective, but injection of the virus into or under the skin appears to be uncertain in its results.

Course of the Disease and Symptoms.—As in other acute contagious diseases an interval elapses between the moment of actual infection and the time at which the first distinct symptoms are exhibited. This is the so-called period of incubation. It may be less than twenty-four hours when a large dose of virus is injected into a vein, but it is very improbable that it is ever so short in cases of natural infection. In the great majority of cases in cattle it is from three to seven days, and it seldom or never exceeds a fortnight.

The first discoverable evidence of infection is a rise of temperature, and this always precedes by some hours at least any outward sign of illness. The thermometer will generally show an elevation of 2 or 3 degrees Fah. at this stage, but soon after the eruption appears in the mouth or on the feet the temperature begins to fall.

The end of the period of incubation is generally fixed by the appearance of distinct symptoms of illness, and in uncomplicated cases in cattle the disease from this point usually runs the following course.

The affected animal shows such general indications of illness as dulness, shivering, loss of appetite, "staring of the coat," and stiffness in movement. These premonitory symptoms are followed by others which are characteristic of the disease. The animal ceases to feed, and is reluctant to move. From time to time it makes a peculiar smacking noise with its lips, from which a more or less frothy saliva escapes. If the mouth is opened, white blister-like elevations will now be found on some part of the buccal mucous membrane (Fig. 1); these soon burst and become converted into shallow erosions (Figs. 3 and 4). When made to move the animal is obviously lame or "tender on its feet"; and while standing it frequently shifts the weight from one leg to the other, and shakes its feet as if to get rid of something adhering to them. This tenderness of the feet is well-marked even before the formation of vesicles; but these soon appear on the skin between the claws, or on the posterior aspect of the hoof immediately above the horn. When the vesicles in the mouth have burst the animal suffers increased pain, rumination ceases entirely, and all food is for a time refused. In consequence of reflex irritation there is a copious secretion of saliva, much of which, from the pain of deglutition, is allowed to trickle from the mouth. The general appearance of the animal is now indicative of great depression—the eyes are dull, the ears drooping, the back arched, and the hair erect

and lustreless. The bowels are generally more or less constipated, and in milch cows the secretion of milk is greatly diminished or almost arrested. Not infrequently vesicles form on the teats and udder.

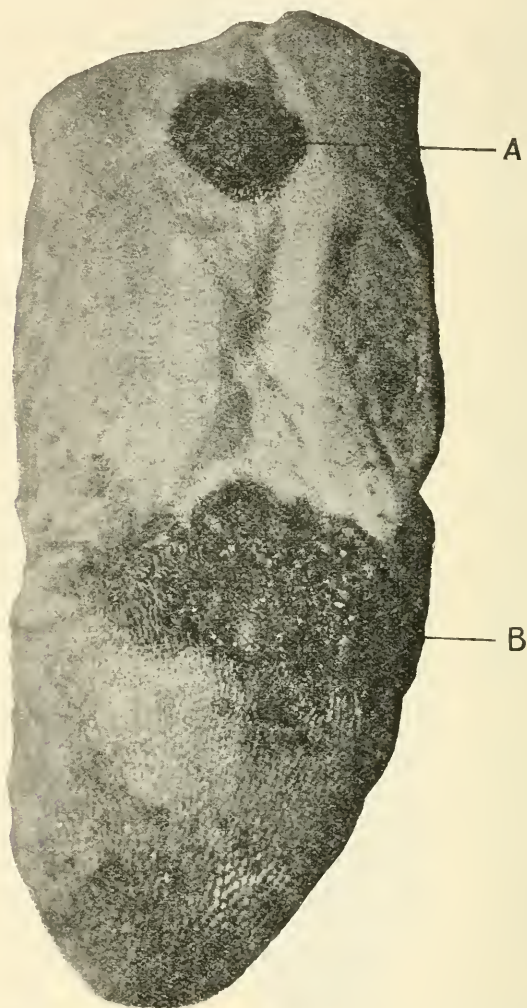


FIG. 4.—A and B, two sores on the tongue. The lower one is exceptionally large.

These symptoms in moderate cases last with little or no amelioration for nearly a week, during which time the animal rapidly loses condition. At the end of that time the fever has

generally passed off, and the pangs of hunger compel the animal to attempt mastication if grass or other soft food is to be had. The tenderness of the feet gradually declines also, and in uncomplicated cases of moderate severity all the visible manifestations of the disease have disappeared within ten or fourteen days after the onset. In young animals, liberally fed, the former good condition is usually rapidly gained after an attack of foot-and-mouth disease; but complete recovery is much slower in older animals, and particularly in milch cows.

The symptoms in sheep are generally somewhat different from those just described, inasmuch as in them the mouth lesions are frequently slight, while those of the feet are more constant and severe. Thus, the chief symptom is great lameness, associated at the outset with suspension of rumination, refusal of food, and febrile disturbance. The pain in the feet is often so great that the animal is unable to gather its food, and lies persistently, with consequent rapid loss of condition. The lesions in the feet are much aggravated if the sheep be driven long distances on hard roads, and in such circumstances "casting of the hoof" frequently results.

In pigs, as in sheep, the feet symptoms predominate. The animals lie persistently in their litter, and when forced to move they frequently squeal from the pain in their feet.

The inability to feed and the slavering which are the constant symptoms of foot-and-mouth disease in cattle are caused by the formation of vesicles or blister-like elevations in connection with the lining membrane of the mouth, and the lameness is due to the similar alterations occurring in the feet. In the mouth the vesicles may form on any part of the lining membrane, but they occur most frequently on the inside of the lips, the pad of the upper jaw and the tongue. The vesicles are produced by the escape from the blood vessels of a watery liquid, which accumulates and forces upwards the superficial horny layer of the membrane lining the mouth. The vesicles vary in size from a five shilling piece downwards, and their outline may be circular, oval or irregular. The membrane over these blister-like elevations is soon ruptured under the movements of the tongue and lips, the liquid escapes, and the vesicle becomes converted into a shallow sore or ulcer. In uncomplicated cases the raw sore which is thus left very speedily heals. That is generally true also of the lesions which form about the feet, but in that position the healing process is apt to be retarded by the presence of dirt which almost inevitably gets into the sores.

Foot-and-mouth disease frequently exhibits remarkable departures from what may be called its ordinary course. These variations may be in the direction of either increased or

diminished severity of the attack. In nearly all extensive epizootics the disease occasionally assumes a malignant and quite exceptionally fatal character, the mortality reaching 20 per cent. among adult animals, and even 60 or 80 per cent. among calves. In this malignant type the course of the disease is rapid, and the animal may die before the formation of the characteristic vesicles in the mouth or on the feet. Death in these cases appears to be due to an exceptionally rapid multiplication of the virus in the system and to concentration of its effects on the muscular tissue of the heart, which after death is found in a condition of fatty degeneration or necrosis.

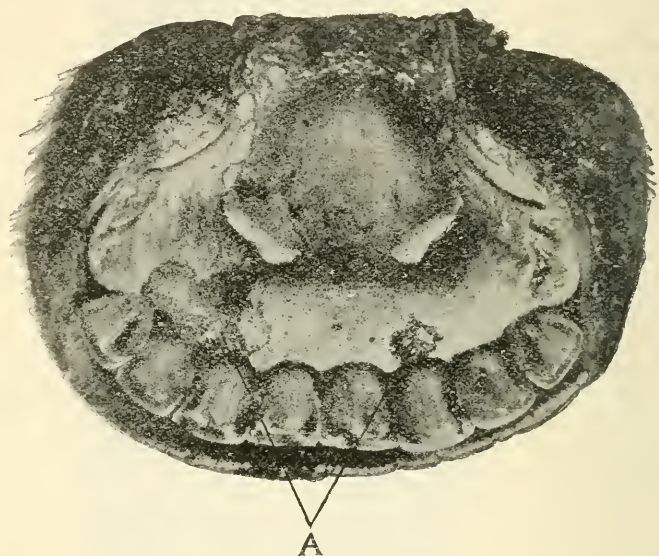


FIG. 5.—Part of the lower jaw showing (A) two sores or ulcers.

The opposite extreme is seen in cases which run an exceptionally mild course, and this type has often been observed towards the conclusion of extensive epizootics in Europe. Where the disease undergoes this modification the signs of general illness may be slight, and the mouth and feet lesions much less severe than usual, while a proportion of the animals in the herd may appear to escape infection altogether.

The cause of these variations in the severity of the disease are not known, but it is a fact of interest in this connection that Loeffler and Frosch found it impossible to keep up the disease by inoculation from ox to ox or from pig to pig. After three or four transmissions in this way it became impossible to carry on the disease from the animal last inoculated.

Although the actual mortality from foot-and-mouth disease is low (probably on an average less than $\frac{1}{2}$ per cent.) the introduction of the disease into any country is greatly to be dreaded, because of its intensely contagious character and the temporary depreciation which it causes in the value of the animals attacked. Even in store cattle this depreciation cannot be estimated at less than 1*l.* per head, and when the diminution in the yield of milk is taken into account the loss may be reckoned at nearly double that sum in cows.

Diagnosis.—Compared with most other diseases, foot-and-mouth disease is not one in which the diagnosis presents much difficulty. But this statement must immediately be qualified by saying that even experienced persons may sometimes find it difficult to say immediately whether a given animal is suffering from foot-and-mouth disease or not. As a rule there is little or no difficulty, and the points which are of most weight in arriving at a decision are that in this disease :

- (1) Vesicular or blister-like lesions are formed both in the mouth and on the feet ; and
- (2) There is evidence that the disease is spreading by contagion.

Difficulty is most likely to be encountered in suspected cases in sheep or swine, as in these animals mouth lesions are more frequently absent or slight. Hesitation in giving a positive opinion may be justified when only one animal is affected, or when the acute stage of the disease has passed off and the lesions are in process of healing. But even in such cases it is generally possible to distinguish between foot-and-mouth lesions and those that develop from other causes about the mouth or feet.

In an article which is not written for veterinary surgeons it is not necessary to enter into refinements of diagnosis. On the contrary, the stock owner or other layman should be solemnly warned not to take upon himself the responsibility of deciding whether any suspected case is one of foot-and-mouth disease or not. His duty under the law is to report any justifiable suspicion without delay to the police of the district ; and it is all-important to remember that simultaneous lameness and slavering at the mouth, even in a single animal, ought to raise a suspicion of foot-and-mouth disease.¹

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¹ The illustrations in this article are from photographs, by Mr. A. L. Sheather, B.Sc., of specimens kindly supplied by Sir Stewart Stockman, Chief Veterinary Officer, Board of Agriculture and Fisheries.

WARPING.

“THE water of the tides that come up the Trent, Ouse, Dun and other rivers which empty themselves into the great Estuary of the Humber is muddy to an excess, insomuch that in summer if a cylindrical glass, twelve or fifteen inches long, be filled with it, it will presently deposit one inch, and sometimes more, of what is called ‘warp.’ Where warp comes from is a dispute. The Humber at its mouth is clear water; and no floods in the countries washed by warp rivers bring it, but on the contrary do much mischief by spoiling the warp. In the very driest seasons and longest droughts it is best and most plentiful. The improvement is perfectly simple and consists in nothing more than letting in the tide at high water, to deposit the warp and permitting it to run off again as the tide falls; this is the aim and effect.”

Such is the theory of warping as given by Arthur Young (*General View of the Agriculture of the County of Lincoln*, 1799, page 276). According to the best information (Marshall, in *R. Econ. of York*, Day, *West Riding Report*) warping was first practised on the banks of the Humber by a farmer at Raveliff named Barker between the years of 1730 and 1740. He is believed to have arrived at this method of improving waste land from seeing deposits of warp left in ancient times by this river on its banks. These deposits formed exceedingly fertile land upon a foundation of what had been a sandy or peaty waste. Barker’s work was afterwards extended by Richard Jennings, of Howden, and the process of warping was first brought under public notice by Marshall in 1788. As will be seen from Arthur Young’s remarks, warp is the local name for the earthy particles held in suspension by the tidal waters of the rivers he names. The composition of warp is shown in the table on opposite page.

The districts where warping is carried on to the largest extent are in North Lincolnshire and South-East Yorkshire, though there are others where very limited areas of warp land are to be found.

The district dealt with in this paper is that with which the writer is most familiar. It is the country surrounding the outfalls of the Trent and of the Yorkshire Ouse. Again referring to the quotation from Arthur Young, a tidal river is essential for the process of warping. For a period of two or three hours, during every twelve hours, the flow of the tide is up stream, and the water level of the river is raised several feet until high water level is reached and the strength of the

tide is exhausted. During the other nine or ten hours the tide is on the ebb and the flow of the water is down stream, the water level falling to its lowest point, or low water, when the tide once more comes in.

In the Trent and Ouse during the equinoctial tides in April and October this reversal of the direction of the flow of the water is accompanied by a tidal wave or "oegre" varying in different parts of the river (and influenced also by the wind)

| | Warp A Kirton | | Warp B Kirton | |
|--|------------------|----------|------------------|----------------|
| | Soil | Sub-soil | Soil | Sub-soil |
| Fine Gravel, above 1 mm. | ·00 | ·00 | ·00 | ·00 |
| Coarse Sand, 1—·2 mm. | ·23 | ·19 | ·11 | ·10 |
| Fine Sand, ·2—·04 mm. | 65·72 | 66·13 | 53·58 | 53·04 |
| Silt, ·04—·01 mm. | 9·89 | 8·82 | 12·32 | 11·00 |
| Fine Silt, ·01—·002 mm. | 10·31 | 9·42 | 10·32 | 10·53 |
| Clay, below ·002 mm. | 2·64 | 3·70 | 14·66 | 16·58 |
| Moisture | 4·40 | 5·56 | 3·23 | 3·52 |
| Loss on ignition | 6·95 | 6·16 | 6·35 | 5·35 |
| Calcium Carbonate | ·90 | 3·78 | { under ·10 | under ·10 |
| Moisture | 1·85 | 1·72 | 2·06 | 2·23 |
| Loss on ignition | 6·95 | 6·16 | 6·35 | 5·35 |
| Nitrogen | ·223 | ·116 | ·184 | ·134 |
| Oxide of Iron Fe_2O_3 | 3·10 | 3·10 | 3·60 | 4·15 |
| " " Manganese Mn_2O_4 | ·10 | ? | ·14 | ·15 |
| Magnesia, MgO | ·74 | — | — | — |
| Lime, CaO | 1·175 | 2·50 | ·62 | — |
| Carbonates | ·902 | 3·780 | ·08 | { under ·10 |
| Potash K_2O | ·532 | ·494 | ·629 | ·645 |
| " " Available | ·04 | — | ·017 | — |
| Phosphoric Acid P_2O_5 | ·125 | ·103 | ·189 | ·136 |
| " " " Available | ·024 | — | ·034 | — |
| Sulphuric Acid SO_3 | — | — | — | — |

from a height of one foot to five feet or possibly more. The writer remembers upon one occasion being in the middle of the Trent in a boat watching the oegre as it advanced. When twenty or thirty yards away he stood up with a view to estimating the height of the wave, and it appeared to him to be about on a level with his eyes.

After the wave has passed the tide rushes up the river at high velocity, heavily charged with warp. The continuous and apparently inexhaustible supply of warp is, we are informed, due to coast erosion always taking place. The warp comes up stream with the tide, and is not brought down by the river, as is often thought to be the case, by persons

unacquainted with warping. A local explanation for the existence of warp in the Trent is that the pressure of the high hill close to the river upon its east side near the mouth causes the bed of the river to rise, and this is scoured away and carried up stream in the form of warp. They assert that the top of the hill is perceptibly lower than at one time. I have heard other theories put forward, but in my opinion they are not worth quoting, and the first of those given here is the one generally accepted.

There are two kinds of warp land, one known as "top land," or "old going land," the other as "new warp land," or simply "warp land."

The "old going land" has been in existence for centuries; it consists of a strip varying in width from a quarter to half a mile, along each side of the tidal rivers wherever they flow through a low lying tract of country. In olden times, before the rivers were banked in, the high tides charged with warp would overflow this land and deposit the mud they held in suspension, and then drain on to the low lands lying further away, making them waterlogged and swampy.

Eventually these rivers were banked in, and these strips of land were saved from the tide.

These tracts of "old going land" are extremely fertile and are excellently well drained. They are consequently in great demand, for no matter what the season—except an abnormal one like the present—a good crop is always certain, in a wet season the drainage is so good that the crops do not suffer, whilst in a dry one they are excellent, the soil retaining moisture to a marked degree.

The other class of warp land is more interesting and is less understood.

As has been already stated there is behind the comparatively high land, in this level country, a low lying peaty or sandy tract. From the nature of the soil, and the fact that it is too low to drain into the river, these districts are of very little value; but provided that they do not lie too high, and are within a reasonable reach of the river, they can be covered with a thick coating of warp, when they at once become very valuable land.

THE METHOD OF WARPING.

The method of warping may best be described by giving the following concrete example, which can be taken as typical of what is being done in several places at the present moment. The land in case consists of from three to four hundred acres lying within four or five miles of the river Trent, or Ouse, and forming part of a large tract of land which it has been decided

to warp. The soil is peat and the level of the land is between high and low water in the river.

The first point to consider is the direction of the warping drain which is to carry the water on to the land. When this has been fixed, the right to make this drain must be obtained. After these preliminaries the warping drain can be cut. It consists of a large dyke from forty to fifty feet wide, but the width necessarily depends on the area of the land to be flooded. The bottom of the drain must be at the same level as the low water level of the river. The excavations from this drain are thrown up on either side to form banks, and these must be two feet above the level to be attained by the highest tide that will be admitted. A sluice is built at the mouth of the drain, constructed of masonry and provided with one or two pairs of large oak doors or flood gates. This sluice will consist of two arched tunnels of heavy stone work, twelve or fifteen feet wide, about the same length, and ten feet high. These tunnels will be side by side in the drain about thirty feet from the river. The floor of this sluice must be of heavy timber, securely fastened down, and level with the bottom of the river. The floor is continued ten feet towards the river and also ten feet back into the drain. Upon the outside of the river end of each of these tunnels a pair of heavy oak doors are hung, hinged to the sides of the tunnel, and meeting and pressing against each other in such a manner that the heavier the pressure of the river water upon them the closer will they fit; and they should be so accurately made and hung that when closed no matter what height the river may be no water can pass through.

Whilst these operations at the head of the drain are being carried out the land to be flooded is under preparation. The whole area is surrounded by a bank the same height as the banks of the drain already made. The material for the bank is obtained from a channel, dug inside, round the whole area to be warped. The warping drain is continued right into the area and connected with the outside channel, whilst numerous minor cuts are also made across the land.

THE FLOODING.

When all is ready the flood gates are fastened open at low water, and as the tide rises the water rushes into the warping drain. The width of this drain being comparatively small and the tide rising rapidly in the river, we find a large volume of muddy water rushing at high velocity along the warping drain on to the land prepared for it. As a result the water soon reaches the far side of the area and then commences to distribute itself over the whole surface by means of the small cross cuts. In

two or three hours the whole surface of the area is covered, provided, of course, that it is more or less level. The depth of water varies from two to three feet, but in many cases it is even more than this, depending on the original level of the land. When the tide in the river has changed from flood to ebb, and its level has fallen below that of the flood waters on the land, these once more run back into the river as clear water, leaving behind them a thick deposit of mud. The thickness of the deposit after each tide varies, when dry, from the thickness of a piece of brown paper up to the eight of an inch. This process is carried on twice every day during the spring, or highest tides of the summer months, and after three years it will readily be understood that a deposit two or three feet in depth has been produced. This depth varies greatly according to circumstances; it depends on the position of the area warped and on the kind of summer, whether wet or dry. It is interesting to note that it is during the summer that the water is most highly charged with warp, and a dry summer more so than a wet one. The reason for this is that there is more fresh water in the river during a wet season. No warping is done during the winter, nor are the neap or smaller tides admitted during the summer months, as they do not attain a sufficient height. The chief object to be attained is the quick and even distribution of the water over the surface of the area, so that the warp may be deposited uniformly upon it. The sandy particles are the first to be deposited and then the clay. We thus get a layer of clay and then a layer of sand. If the cuts are not properly arranged there is a risk of there being a bank of sand at the entrance to the area, and a bed of clay at the further side of it.

After three years, or whenever it is considered that there is a sufficient depth of warp, the land is "taken off," that is to say the warping process is stopped and the flooding ceases.

The area will now consist of a smooth level surface of mud, the cuts originally made being to a great extent warped up. The function of the warping drain is now that of an ordinary main arterial drain, and when the surface is dry the first thing to do is to cut ditches emptying into the warping drain, which discharges in its turn into the river.

The two great aims in warping are, first, that the whole area shall be of uniform quality, the sand and clay being equally mixed, and, secondly, that the level of the new land shall easily admit of drainage. As the surface of the land is a dead level, the drains have to be given an artificial fall, and if this is carelessly done the land will soon become waterlogged and comparatively valueless, whereas when properly carried out a prolific area of new or virgin land is the result. It frequently happens that the warping process has not been continued long

enough, with the result that the land at the finish is left at too low a level, or it may be that the subsoil has subsided to some extent. In cases such as these there are two courses open, either to repeat the whole process, or else, to erect a pump and engine and to pump the drainage water from the low lying land to the higher level of the river, as is commonly done in fen and marsh districts.

The first crop to be grown on the new soil is white clover. This crop is kept down for some time as the land is, at the outset, cold and short of vegetable matter. White clover not only grows on this land exceedingly well, but it also has been found to be the best preparation for succeeding crops. It is whilst the land is under this crop that the drainage works described above can be carried out. After the land has been properly drained it is divided up into farms varying in size from about 150 to 200 acres, and buildings, &c., are erected. Farms of about this size are found to be the most convenient and the most readily let; they will command a rent of 2*l.* per acre or more.

THORNE MOORS.

The account of the warping process in the foregoing pages is descriptive of the general method in operation. There is, however, a large district where warping, or rather the preparation of land for warping, differs to some extent. The district known as Thorne Moors consists of a waste tract of country lying between the Trent and the Ouse and extending about four miles each way. It is a comparatively high piece of moorland, and till recently it was a dangerous swamp. Deep ditches have been cut through it and the water drained off, and it is now comparatively sound. The moor consists of peat moss, and all kinds of vegetable matter of a light yellow colour, for a depth of several feet, gradually merging lower down into blacker peat in a further state of decomposition. It is of exceptional interest to the botanist, consisting as it does of so many forms of early plant life in an extraordinarily good state of preservation. For some years a Peat Moss Litter Company has been established upon these moors, and a large number of men (in the first instance Dutch) are employed in "graving" the turfs, stacking them into huge piles to dry, and then carrying them to the factory where they are torn into fine fragments, pressed into bales and sent all over the country for litter, for the sugar refining industry, and for other purposes. In this manner the surface of the land is lowered several feet, and becomes available for the warping process, whilst, at the same time, the material removed is disposed of at a profit.

One or more farms in this district have already been warped and "taken off," and others are undergoing the operation. Another instance might be given of how land has profitably been prepared for warping. In this case the level of the land was lowered by clay being dug out for the manufacture of bricks. The pits were near the river, and were connected to it by a culvert at a very small cost. At the head of the culvert a door was hung, and at suitable tides this door was opened to admit the warpy water. At low tide the clear water was allowed to flow back into the river. These pits are now level with the surrounding land and form a very fertile soil.

Some land has occasionally been cart warped; that is, warp has been run in trucks on tram lines and spread on poor land. This, however, can only be done on a small scale.

COST.

It will at once be understood that the cost must vary within wide limits, depending as it does on so many conditions. On land near a river, and not lying too low, and therefore necessitating high banks and a lengthened period under water, the cost is low as compared with land under the reverse conditions. Then again, if the warping drain, with its costly sluice, can be made to serve for a very large tract of land, say for instance, for two or three thousand acres, bit by bit, the expense is obviously very greatly reduced.

In the case of the Thorne Moors one would expect the cost to be almost the minimum, for not only is the originally valueless land prepared for warping at a profit, but here also is one of those cases where a drain and sluice can be made to serve a very large area which is being warped in successive enclosures. The average cost is usually quoted at 20*l.* per acre, which includes the cost of the drain, sluice, flood gates, banking, and all other expenses entailed in warping, together with the after preparation for farming. It further includes the loss of rent during the time the land is being warped, but it does not include the cost of erection of houses and buildings. The sluice at the warping drain head is a very costly item, and may be as high as 2,500*l.*, but this, of course, would serve for a large tract of land. On the other hand, when warping is on a small scale, the cost of the sluice need not be high, and in the case of the brick pits just quoted it was almost negligible.

CROPPING OF WARP LAND.

Warp land on the whole is usually very well farmed, and first rate crops are obtained.

Forty or fifty years ago farmers of this land had almost the entire monopoly of the potato trade, with consequent high

prices. Not only is the land especially well adapted for this crop, but also the produce could be taken easily to market at a low rate by water transit. With the development of railways, however, other districts were opened up for potato growing, and were able to compete with this locality, and prices consequently fell. The rotation of crops most generally followed on warp land is a three course shift :—

- (1) Potatoes.
- (2) Wheat.
- (3) Oats, or seeds, or turnips, or beans.

The potato crop is expected to give the greatest monetary return ; it is very highly manured, and in good seasons pays exceedingly well.

It is most important to grow only a suitable variety, some kinds being comparatively valueless upon warp land. For years the Up-to-date, the Reading Giant, and the British Queen were most popular and profitable, but these are now “grown out,” for, like all other varieties, they could retain their vitality only for a limited number of years. It is a well known fact that no variety of potato can be grown for more than eight or ten years, and then only by repeatedly changing the climate and soil : after that time lighter crops are produced and susceptibility to disease is much greater.

During late years the Evergood and the King Edward VII. have been most generally grown, but other new varieties are now gaining ground and will no doubt eventually take their place.

Warp farmers manure their potato crop very heavily, the most up-to-date of them give about 15 tons per acre of farmyard manure, or cow-keepers', or horse manure from the towns : if they have ploughed in their second crop of clover, as frequently happens, rather less farmyard manure will be given. In addition to this about half a ton per acre of artificial “potato manure” will be purchased from a farmers' company, or from some firm of good repute. The better course, which is pursued by some men, is to mix their own ingredients, and experiments have proved that a mixture of 6 cwt. of superphosphate and 4 cwt. of nitrate of soda produces excellent crops. Potash is of little value upon warp. We have known a yield of 14 or 15 tons of potatoes to the acre under this treatment, but 10 or 12 tons may be considered a good crop. Of this there will be 1 or 2 tons of waste, and a similar quantity of small or seed. The potato crop is followed by wheat, and this, it may be said, is always good, the only fear being that the crop may be too heavy and get laid. Only short-strawed, stiff-growing varieties of wheat should therefore be grown, and

if these remain standing until harvest the yield is usually very heavy, say 8 or 9 quarters per acre.

The third crop in the rotation will be clover, oats, and roots, or oats followed by clover may be taken. Oats almost always get laid, and even then they may yield very heavily, 10 or 12 quarters being nothing uncommon. Clover grows very luxuriantly. Red clover is sown for mowing, and this often is a very profitable crop, up to $2\frac{1}{2}$ tons of hay per acre being got. As already said, the second crop is frequently ploughed in, and is the very best preparation possible for the potatoes to follow. Warp land grows very excellent mangold wurzel and first-class turnips, both of which are, of course, pulled and stored for cattle. At one time flax was very extensively grown, but latterly the market for it has dwindled to nothing, and oats have taken its place in the rotation.

LABOUR.

From the foregoing it may be anticipated that the labour bill upon a warp farm would be a heavy one, and such is the case. A pair of horses is required for each 30 acres of arable land, first-class shire horses being in most general use and usually in good condition. As to regular manual labour, a farm of 100 acres of arable land, in addition to the grass, would require four labourers permanently, and their wives also would find work upon the farm the greater part of the year; three young horsemen would also be needed. Further, a gang of eight Irishmen would be wanted for a fortnight or three weeks to gather the potatoes. This is much above the average of the number of hands engaged upon farm work throughout the country, and it follows, therefore, that the process of warping creates a considerable demand for labour, and causes an influx of population into the neighbourhood.

STOCK.

With regard to live stock, it is a rare thing to see sheep upon a warp farm; still, if a few are kept, but only a few, they are most profitable. A few cull ewes, say forty of the Lincoln breed (upon an average farm such as above), should be bought in the autumn and put to a Hampshire Down ram. These will pick up their living upon the young seeds, and later upon the grass with a few swedes thrown to them. The lambs should be timed to fall early, and they may all for some time run upon the clover for mowing, afterwards upon the grass. Probably most, if not all, the lambs will be sold off fat, and the ewes will also go off fat during the summer, making room for a fresh lot.

The cattle kept are usually of the Shorthorn breed, some farmers going in for raising young stock, whilst others purchase two-and-a-half or three-year-old bullocks, feeding some upon the grass and others later in the yards or stalls.

A large number of pigs of the large Yorkshire or Lincolnshire breeds are usually reared and fed upon a warp farm, the waste and diseased potatoes being the very best and cheapest food for them.

As might be expected, the alteration in the physical condition of this district, due to the presence of large tracts of mud and water, is accompanied by a change in the bird life of the neighbourhood. Thousands of wild fowl of various kinds are to be met with, and it is an interesting fact that for many years after land has been "taken off" wild geese regularly visit the same localities during the winter.

Porpoises are occasionally to be seen making their way up the rivers Ouse and Trent in pursuit of the salmon, upon which they feed.

The warping process is not unknown in other countries, and is to be found, for example, in Italy, in the Val di Chiana. Few people, however, realise that in the small corner of Lincolnshire to which the writer belongs thousands of acres of waste have been, and are being, converted into land as fertile as any in the kingdom. Reclamation of land is nothing new; it began in Romney Marsh, probably before the landing of Julius Cæsar, and we have only to go to the fens of Lincolnshire for more recent examples; but nowhere in England, except the districts named at the beginning of this article, is agricultural land actually being made.

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ENGLISH TIMBER AND UNDERWOOD.

A GREAT deal has been written in favour of new methods of producing timber. It seems to be at least equally important to advocate new methods of utilising and marketing existing supplies of English timber and underwood, and to remedy what is universally admitted to be an unsatisfactory state of affairs. Nothing has retarded forestry in England more than the poor price obtained for the output. It is hopeless to expect enthusiastic effort to improve our woodlands until landowners are assured of remunerative prices for the produce they are advised to grow. Therefore, the most pressing matter to-day in regard to English timber and underwood is to show how proper markets can be assured and proper prices obtained. The policy of "practice with science" has done wonders for agriculture, and the failure to adopt this policy in the production and, especially, in the marketing of English timber and underwood is responsible for many of our present troubles.

Since the larger issues of general policy are often obscured by relatively unimportant details, it is advisable to treat the matter broadly and to speak in general terms, which must not be applied too strictly to individual districts. The important connection between production and marketing being so often overlooked, one may well deal first with the question of marketing.

Few people realise the anomalies that exist in regard to the marketing of English timber and underwood. It is impossible to give here more than one or two illustrations, but these could be multiplied indefinitely. Despite iron, wire and other substitutes, the consumption of wood is ever increasing, and our imports alone of wood and timber for 1912 reached a total value of 28,351,315*l*. Yet, with so enormous a consumption, we do not find proper markets for our native supplies of timber, which are infinitesimal in comparison. That our failure so to do is not solely a question of price must be apparent to any one who analyses the prices of much of the foreign timber, or who studies the quotations in the various trade publications.

Take any given timber—oak, for instance. Although we all know that iron has replaced wood for shipbuilding, few apparently realise that the consumption of all classes of oak timber in this country probably was never greater than it is at the present moment. Furthermore, good as were the prices obtained for oak timber in the days of wooden shipbuilding, it is doubtful if the prices paid for good oak by the consumer

were ever higher than they are to-day in some of the best markets, such as those for constructional and interior work, &c. Our native oak is proverbially the finest in the world, and, given as much care and knowledge in its conversion and seasoning (which is rare) as foreign oak receives, it should be preferred for many high-class purposes. Yet the price obtained for even good English oak is invariably very poor.

Again, take any of our native conifers—our much-maligned Scots pine, for example. It is common knowledge that, for estate and other purposes, enterprising firms in the foreign trade are sending foreign Scots pine all over the country (in some cases at a high cost for railway transport), and the price to the consumer must be, in many cases, very much greater than that for which native supplies could be obtained. Yet we have in our midst, even in many of the districts to which the foreign timber is sent, supplies of native Scots pine (surely suitable for creosoted boards and other purposes) for which there is scarcely any demand.

Such anomalies are numerous, but the examples given suffice to emphasise the importance of considering the causes, and pointing to the remedy.

Several general causes have contributed to the present unsatisfactory position, the principal being:—(1) Failure to appreciate the change of conditions and the need for methods different from those which prevailed when English timber was required for a single market (such as the dockyard), or for the requirements of local builders and wheelwrights, and underwood by local bakers, hurdle-makers and others. (2) Failure to keep in touch with other than local markets, and reliance on purely local competition and demand. (3) The absence of co-operation and proper methods in the marketing, essential to successful competition with highly organised foreign supplies.

It must also be remembered that many unfortunate circumstances combined thirty years ago to bring about a complete change in our rural conditions, and severe depression in all branches of rural life. Our previous period of exceptional prosperity also completely unfitted us to fight severe foreign competition, or to meet the altered conditions.

THE MARKETING OF ENGLISH TIMBER.

In early times, apart from the question of hunting and sport in the forests, and the value of wood for fuel and other primitive purposes, a woodland had considerable value for the production of food for swine. The crop of acorns, beechmast, &c., was then very important. We know also that one of the most esteemed trees, centuries ago, was the yew, which furnished bow staves.

As the country became more civilised and conditions altered, better uses were found for the timber and underwood, and the Rating Act of 1601 proves that "saleable underwood" was of importance at that date. During several centuries the most important timber was oak, for shipbuilding. Length and diameter of butt were important, but, owing to the shape of ships, curved pieces of timber were also required, so that they could be cut with the grain, and there followed a special demand for curved pieces of oak. Again, a natural bracket being better than a mortised or artificial one, brackets for supporting decks, &c., were made from "knees" of oak timber. Special lengths and sizes of oak timber were also in request, but although a big demand for oak knees and bends undoubtedly existed, its importance has been much exaggerated. The special demand for a given size or variety of timber naturally ensures a special price, which in turn, encourages methods of so producing the timber that as many trees as possible may realise it. John Evelyn, in *Sylva*—the first classic of English forest literature, written in 1664—explains how an oak should be grown to produce the crooks, bends, knees and other special requirements of the navy. There is still a small demand for oak knees, but few people would now advocate growing oak for this purpose. Long, straight and clean timber, free from bends or side-branches, is in most request. Every limb on the stem—meaning a knot in the plank—renders the timber of less value for present-day purposes.

Through past centuries and up to comparatively recent times, almost the only agitations for the proper production of timber in this country aimed at improving the supply of oak for shipbuilding. Such agitations were many, as timber for the navy was naturally of supreme importance. So much of our old literature and tradition had to do with producing and marketing oak for shipbuilding, that the method of marketing and growing oak for this purpose has permeated our system so thoroughly as to leave its mark on present-day marketing and on production in the woods. The business methods of many timber merchants are still founded on handling oak for the navy. Many woodmen still advance the same arguments in regard to the growing of timber to-day that have been handed down to them for generations. These views, possibly, were sound in the shipbuilding days, but it does not follow that they are correct to-day, when the timber is required for other purposes.

Many persons seem still to imagine that our oak, being no longer in demand for shipbuilding, is unsuitable for other uses and markets. As all our timbers are viewed thus pessimistically, it is advisable to dispose of the fallacy by analysing the basis

on which it is founded. It is due to several causes, not the least being our common failing of exaggerating our faults. Because timber does not answer the stringent requirements of Government inspectors, it does not necessarily follow that there are no other markets for it. Because our native Scots pine is thought unsuitable for telegraph poles, one has no reason to infer that it is unsuitable for many of the purposes for which foreign timber is used. Because some of our oak is not so long in the butt as the foreign oak, it is not therefore unsuitable for many purposes where diameter is more important than length. In nearly every paper on forestry or discussion on timber, we find the defects of our native timber dealt with at length and scarcely a word in defence of its good qualities or suggesting fresh markets for it. We are inclined to attach too much weight to reasons advanced by merchants for not offering a higher price for native timber, and to criticisms of English timber advanced by those interested in foreign timber. It is not customary in any industry for a purchaser to praise the goods he is buying, or for a competitor to suggest that they are better than his own.

Again, visits to continental countries, though invaluable for illustrating the result of proper methods of silviculture, have served to emphasise defects in our native timber. If we are adopting a general system of high forest, we can learn valuable lessons from countries where this system has been in vogue for generations; but this should not prejudice us against making the most of our existing native supplies. No one would advocate a landowner growing oak on a 280 or 300 years' rotation, as in the case of the famous Spessart oak in Germany. The fact that we are often shown such exceptional timber when we pay a short visit to continental forests makes us prone to imagine that all foreign oak is of equal quality. The best of the Spessart oak realises from 7*s.* 6*d.* upwards per cubic foot for special markets for veneers, &c.; exceptional oak of this character does not compete with our native supplies. There is no question that foreign timber, on account of the manner in which it is grown, is generally much cleaner and longer in the butt than our native timber, but there are markets in which diameter is more important than length. With our huge consumption of all classes of timber there are plenty of good markets, if we will only develop them by adopting as far as possible the foreigner's up-to-date methods.

The principal reasons for the poor prices obtained for English in comparison with foreign timber are:—

1. Lack of proper methods in marketing, which causes the consumer much more trouble with native supplies than with foreign. This prejudices consumers, inspectors, and others

against the native timber, and leads them to exaggerate faults in it that would be overlooked in foreign.

2. Want of knowledge and care in the conversion, seasoning and marketing of our timber, which accounts for many of the objections urged against it.

3. Lack of pushing and advertising our own timber, with the result that the consumer does not appreciate its superior qualities for many purposes.

With the object of pointing to the remedy, one may draw attention to the several exceptional handicaps from which English timber and forestry suffer. (*a*) Foremost come the unfortunate facts that our native supplies are widely distributed and of a very mixed character, and that the cost of inland transport is so heavy. (*b*) So many of the most up-to-date and enterprising timber and underwood produce merchants have dropped the native in favour of the foreign trade. This is due to the superior methods of the foreigner, and to the greater ease with which his supplies can be handled. The natural result of this is that many of our English timber merchants are handicapped by want of capital and also of knowledge of their business. They are also fearfully lacking in enterprise, as has been illustrated in the case of the Scots pine. (*c*) The various branches of agriculture are so much more important in our rural districts that few people find time to pay proper attention to the woodlands. The English timber and underwood industry seems, therefore, to be the Cinderella of all branches of rural economy.

In spite of all this, the position is not nearly so hopeless as is generally assumed. Each and all of these handicaps point to only one solution of the problem, namely, securing to the English timber and underwood industry a benefit that agriculture has enjoyed so freely. It seems scarcely possible to think of agriculture being left to take care of itself, without the numerous agricultural bodies which protect all branches of its interests. The absence of similar protection in the past is largely responsible for the position of English timber and underwood to-day. Owing to the nature of the problem, individual action, as illustrated in the present unsatisfactory state of things, will not solve it, and the remedy lies in the direction of joint action, increased knowledge and information as to markets, &c., and the institution generally of improved methods. There is seldom a five minutes' solution of these problems, and those who have studied the question fully are agreed that by far the best policy is to support the English Forestry Association, which has been formed to improve the position and to protect the producer's interests in the marketing of English timber and underwood.

Since the solution of the underwood problem is generally even more urgent than that of English timber, and since it affords a good illustration of the importance of proper methods of marketing, it is well to refer at length to

THE MARKETING OF UNDERWOOD.

It has been repeatedly emphasised by Departmental Enquiries and forestry literature that our woods are of too open a character, and the oak and other standards are far too isolated. This has been brought about in several ways:— (1) Agricultural depression and death duties, leading to the general over-thinning of woods to raise money. (2) The influence of growing oak for the navy, and also the effect of the production of larch. (3) The most important, viz., the large income obtainable in the past from underwood. The old saying that “underwood buys the horse and timber buys the saddle,” showed the respective importance of these. Underwood, in the shape of hazel, ash, &c., required plenty of light, and, therefore, if the standard trees were grown too close, the valuable underwood was suppressed.

Apart from the natural standing trees, there were two methods of producing poles and brushwood for fuel and other purposes. These were: (1) From “stools,” under the process of “coppicing”; (2) From “pollards,” under the process of “pollarding.”

The underwood stool was in vogue in plantations and woodlands hedged in to exclude deer, sheep, cattle, and other animals. In the open forests, on the commons, wastes of the manor, or in pastures, where animals were allowed, it was difficult to produce poles grown from stools, on account of the damage which the young shoots would sustain. Where poles were required on land ranged by deer and cattle, it was therefore necessary to follow some method other than coppicing, and this led to the introduction of the pollard. Trees treated in this manner are still very common, and, whether willows growing by streams, ash or elm in pastures, or beech or hornbeam in forests, it will be noticed that the pollards are invariably about eight feet high. This height has survived through centuries, and was probably adopted originally as being the least at which the shoots were safe against the depredations of animals. The fact that copyholders, commoners, and farm tenants were often allowed the produce of pollard trees, but not of standards, also led, in many cases, to the creation of pollards. Since the general introduction of every description of foreign wood on a large and well-organised scale, and also of coal for fuel, the importance of both coppicing and pollarding has decreased.

Although pollarding is now almost a lost art, there are indications that this system may be revived, and it offers many advantages for the production of poles and rods. As a short digression, it is interesting to note that many of our oldest picturesque trees are pollards, the relics of ancient systems of silviculture, and illustrations of the increase of life given to a tree by pollarding.

The commonest method of growing coppice was in a mixture with oak and other standard trees. This old system, usually known as "coppice with standards," was certainly *then* the most suitable system of silviculture for this country, and by far the most lucrative, owing to the good demand for the produce. In districts where there was a big demand for a special variety, certain species of coppice were grown pure and without the standard trees, since the coppice alone offered greater advantages. An instance of this to-day is chestnut coppice in Kent and Sussex, which was in special demand for hop poles and wooden hoops. Ash poles were valuable for hurdles and other agricultural uses; and for both chestnut and ash poles, grown in a proper manner, there is probably still a good future. Hazel was grown for wattles, withies, thatch stakes, crates, and many other articles. Oak coppice is to be found in various districts, especially in the West of England. It was valuable for the production of oak bark, at one time in great demand for tanning. Alder, birch, hornbeam, &c., also were produced to meet some special demand. The most unfortunate feature of underwood to-day is that a large proportion of it is of a mixed character and includes many different species. As in the case of timber, the mixed nature of the crop has a detrimental effect on both its production and sale.

Although many of the old local markets for underwood have disappeared, new ones in many cases might be cultivated, but these will be principally of a wider nature than formerly. Thanks to the increase in price of much of the foreign produce, we can compete successfully in many markets to-day that would not have been profitable twenty years ago. It is a mistake to assume that the foreign raw material or manufactured article is always purchased because it is cheaper; in many cases the preference is due solely to proper methods of marketing. But new markets and conditions require new methods. Methods that suited the marketing of underwood for the old brick oven are scarcely suitable for the large commercial industries of the present day. In many cases, for the tool, bobbin, games, and similar trades, native poles and underwood might be purchased if markets were cultivated and organised so that a proper and regular supply of the produce could be ensured.

It is impossible to enumerate here all the markets which might be cultivated for underwood, or to explain fully industries which might be encouraged or established. In addition to the output of all our home industries, the imports of wood ware, wood turnery, and other items of a like nature in 1912 totalled 2,285,453*l*. Surely we could secure a part of this sum. There might be now a considerable extension of industries similar to the clog, helve, hoop, crate, tent-peg, cleft-fencing and other local industries, provided they were properly organised and up-to-date marketing methods instituted. On the one hand, we have the raw material, which can be purchased so cheaply to-day; and on the other, markets in our midst, in which, in many cases, quite fair prices are ruling. Individual action on a small scale is useless, and the only chance of success is to act on a complete and large scale, and with a wide instead of a merely local knowledge of supplies, markets, labour, &c. Organising new and reviving old woodland industries, and cultivating proper markets for underwood and timber, will increase the prosperity of rural districts and secure proper markets for coppice, and this is one of the objects of the English Forestry Association.

The day has long passed when any rural industry should be left to take care of itself, and it is impossible for land-owners, land-agents and agriculturists, with their numerous and varied interests, to keep, unaided, in proper touch with every branch of rural economy.

Anything that adds to the contentment and prosperity of rural districts deserves every encouragement, but the important influence on agriculture of the coppice problem is often overlooked. The labour problem is always an important one to agriculture, but this is likely to be even more urgent in the near future. The principal difficulty in any labour problem is to ensure regular and constant employment. During severe weather in the winter months, work connected with the woods is practically the only regular employment that can be offered to many classes of agricultural workers. Furthermore, work in the woods has a good effect on workmen, and woodmen are often the best and most contented workers to be found in rural districts. Increased prosperity of woodland produce is therefore doubly important, accompanied by the revival of industries which formed so interesting and delightful a feature of rural life little more than a generation ago.

THE PRODUCTION OF ENGLISH TIMBER.

Since this branch of the subject has received more attention than marketing, its anomalies are not quite so apparent; but a moment's thought will show that they exist.

We are assured by all authorities that we can produce in this country as fine timber of many species as any country in the world. This fact is largely confirmed by the fine timber that has been produced in many districts in the past. Few countries have so small a percentage of woodland relatively to the area of land that authorities maintain will produce good timber, and which at the same time will give a better return from forestry conducted on proper economic lines, than from its present use. Few, too, have larger and more important markets for all classes of wood than the United Kingdom. Yet in few countries has so little attention been given to forestry.

Since, as in marketing, larger issues of policy are often obscured by less important details, it is advisable again to cover the ground in a broad and general manner.

Advocating improved methods of forestry does not necessarily imply enthusiastic support of large schemes for State afforestation, or even for planting up new areas of land at present devoted to other purposes. Opinions may differ on some of these points, but surely not about the urgent need for tackling existing woodlands. With such a number of our woods returning next to nothing, with so large quantities of trees past maturity or never likely to make good timber, it must appear peculiar to any observer that the subject of forestry should not only receive so little sympathetic consideration, but even experience opposition in some quarters. That in estate forestry the production of trees for purposes of sport, ornament, &c., should often take precedence of raising timber for profit is not sufficient reason for the existing apathy. The preservation and succession of trees and timber is of even greater importance on a residential estate than in State forests, and the object of forestry is to apply the policy of "practice with science" to all branches of arboriculture or silviculture.

It seems of primary importance to enumerate some of the factors which have resulted in the present unsatisfactory position of forestry in this country, and at the same time to illustrate the important influence of markets on production.

Some might suggest that the first cause of depression in prices of timber and underwood was the final removal of the duties on imported timber in 1866. This might have resulted in lower prices after the foreign trade had developed, but lower prices were inevitable, and were due to far more important causes, the principal being increased facilities for transport, the general development and opening up of new countries, and the change in our general conditions at home. Fresh and wonderful supplies of all classes of wood were suddenly available, and these could *then* be sold in this country at a price that represented little more than expenses of marketing and

transport. The introduction of coal, iron, wire and other substitutes for wood also helped to ruin our old local markets for woodland produce, with the result that coppice and timber depreciated until producers were inclined to give up the unequal fight as hopeless. To institute new and up-to-date methods of timber production was almost impossible in many cases, owing to want of capital and other reasons. The old system of "coppice with standards" was looked upon as out of date and hopeless. Since good clean timber was in demand, a general system of high forest was advocated, similar to that in vogue in many districts on the Continent, in order to produce timber of equal quality to the foreign imports.

In a country that for its size is unique in its variety of geological formations, soils, aspects and local conditions, it was inevitable that opinions should differ as to the trees to be generally planted. Naturally, perhaps, we experimented with all sorts of varieties and mixtures of trees without sufficient consideration of their individual requirements and conflicting peculiarities.

The same causes led to the planting of mixtures of many varieties in the hope that some, at least, would flourish. In many cases the mixture itself was not so much at fault as the want of method afterwards. Conifers were planted as "nurses" to the hardwoods, and, since the nurse was not cut out when originally intended, the nurse killed the child. It is impossible to enumerate the advantages and disadvantages of different mixtures, but, to instance only one as an illustration, take the familiar mixture of larch and Scots pine. The natural requirements of these two trees as to soil and general treatment are very different. To ensure proper suppression of side-branches in the Scots pine (which are specially objectionable in this tree), it should be planted very close, and for many years it is important not to thin too heavily, so that height and also clean growth may be secured. The larch is about the most useless of all trees for suppressing the side branches of Scots pine. In direct opposition to the requirements of Scots pine, few trees really require more light and room than larch. A thinning must be therefore good for one and bad for the other. If it is intended to cut out the Scotch in the thinnings to ensure a crop of mature larch, few trees are more valueless than Scots pine thinnings. Furthermore, few thinnings are more dangerous, either when felled or when used as fencing rails, &c., close to other trees of Scots pine, owing to the fine breeding ground for the pine beetle which the poles provide, *if left unbarked*.

Enough has been said to illustrate the importance of full consideration before planting, even in the case of a mixture of only two varieties. When, as is common, in addition to larch

and Scotch, we find spruce, sycamore, Douglas fir, oak, or other species together, the complications in management and the disappointment on sale may be imagined.

Almost every district has its special trees or system of forestry, and, provided the production is on proper lines and there is a proper and satisfactory market for the produce, few persons would advocate a general change except for really good reasons. The mistake more often lies in the methods of production than in the varieties grown.

Whatever variety of trees and systems of forestry may be suitable for large schemes of State afforestation of waste land, different conditions rule in estate forestry. Proposals relating to estate forestry should always, if possible, err on the side of simplicity, early return and adaptability. Again, in existing woodlands, proposals will usually apply to better or deeper soils than those of the waste land used for State planting. As a general rule, not to be applied too strictly to any given locality, but taking all the conditions of estate forestry into consideration, hardwoods are more suitable for estate planting than the majority of conifers, larch excepted. Surely our much longer experience with hardwoods, their general suitability for purposes of sport, and for English as distinct from Scotch estates, as well as their greater freedom from fungi, insects, &c., &c., should give them general preference over conifers. Furthermore, many of the demands of our best markets are for hardwoods, and while we remain a manufacturing country the respective importance of hardwoods will probably increase rather than diminish.

After the questions of soil and special local conditions have been considered, one should select for general planting on an estate a tree which possesses some of the following advantages:—

1. Early maturity, giving a short rotation.
2. Valuable thinnings, saleable at any age.
3. Timber of high intrinsic value, with a wide range of uses.
4. Valuable for game, ornament and other important estate features.
5. Saleable in small lots, and, if possible, suitable for local uses.
6. Easily produced and managed, thinnings, &c., included.
7. Indigenous, or of a kind of which we have had considerable experience in this country.
8. Comparative freedom from liability to damage by insects, fungi, frost, drought, gales, &c., &c.

Another advantage would be immunity from damage by rabbits, but scarcely any tree is entirely rabbit-proof, and precautions must be taken with all.

The actual selection will depend on the soil to be planted; and on very poor land proposals may be limited to Scots pine or similar trees. As a general guide, the three most valuable trees for planting in woods on the majority of English estates are ash, Spanish chestnut and larch. Additional advantages are that on some soils the three trees can be grown together, and also that, if necessary, either or both ash and Spanish chestnut can be coppiced. There appear few more promising trees to grow than English ash, owing to the special qualities of its timber. Its production with Spanish chestnut and larch should result in the finest quality of ash timber. There are many situations and soils, especially on the slopes of glens and valleys and on greensand, where the Douglas fir will probably give a better return than any other tree. Its great importance for the rapid production of timber must certainly not be overlooked, but we require further experience of it on some soils, and must be cautious before adopting it on too large a scale. A peculiarity of England is the importance of timber in spinneys, pastures, hedgerows, &c. Without touching on the debatable subject of the desirability or otherwise of hedgerow timber, there are only a few trees that need be considered for general planting in these situations when the object is solely timber for profit. The most important are, the black Italian poplar (*Populus serotina*, sometimes called *Populus monilifera*), and the Cricket-bat willow (*Salix alba cærulea*). The timber of our common English elm should realise higher prices, but it is unnecessary to discuss its production, since it seldom requires assistance. Its extraordinary power of reproduction from suckers has already ensured its survival through generations and adverse conditions. Other varieties of elm, especially the wych elm (*Ulmus montana*), should receive increased attention for planting in spinneys, &c., as the timber possesses special value for many purposes. The most vigorous and quick growing variety is that known as the Huntingdon elm (called by Dr. Henry, *Ulmus vegeta*), but it appears to produce a short butt, and little is yet known of the intrinsic value of its timber.

It is not possible to enter into actual details of planting, but a brief reference may be made to the timber of the five trees advocated. Plantation ash is much more valuable for the best markets than hedgerow trees, and the faster it is grown the better. Spanish chestnut should realise higher prices in the future, owing to its durability and large proportion of heartwood, and on some soils few hardwoods will produce a better or quicker return. Its timber after a certain age becomes very shakey on some soils and it much objects to those containing lime. Larch is too well known to need special reference, beyond stating that fresh markets must be cultivated to ensure

a proper demand and price for our large supplies of this timber. There are few rapid growing trees whose timber seems suitable for so many purposes and which has such special qualities as the timber of black Italian poplar. The small lots that have been marketed in the past form little guide to its value with proper supplies of the timber available. The Cricket-bat willow has realised extraordinary prices during the past few years, and it is too much to hope that these will continue. It offers, however, other attractions for an early return in selected situations, owing to its wonderful vigour of growth and quality of its timber. A great advantage of both black Italian poplar and Cricket-bat willow for growing in pastures, or even in hedgerows, is that, thanks to their erect habits and light canopy, little damage is done by their shade to either crop or hedge underneath.

The delusion is so widespread that clear-felling a wood in large squares is the only method of reproducing high forest, that it seems important to refer briefly to the different systems of production. There are three principal systems under which high forest is reproduced—(1) The selection system, where single trees distributed over an area are selected and felled periodically. (2) The group system, which is an expansion of the selection, inasmuch as, instead of one tree, several trees are felled in the same spot, and the wood is reproduced in groups. (3) The compartment system, where an area is either clear-felled and re-planted, or a system of natural regeneration instituted. Each system has its limitations, and is applicable to different varieties of trees and conditions, and often in estate forestry any system has to be adapted to meet special circumstances.

The advantages of natural reproduction are so generally overlooked, especially with our oak, ash, and other indigenous trees, and much greater attention should be given to this in the future. The increase in the number of rabbits has had a very detrimental effect on natural reproduction, and few people realise the damage which these animals inflict on the woods until an area has been surrounded by wire netting.

A common fallacy as to planting is that no return is secured before sixty years. This may be true of oak and some trees, but there are other trees and systems of forestry from which an early return can be obtained. Omitting coppice and produce of a like nature, the quickest return at present from any tree is probably that from Cricket-bat willow; but this, of course, has its special limitations. Douglas fir also brings a large return on a short rotation, as can be seen in many places. Ash, larch and Spanish chestnut all have their advantages for an early return. Several other trees, some of recent introduction,

are capable of early return, but it is inadvisable to enumerate them without the necessary reservations.

All trees have their individual requirements, not only as to soil and conditions, but also as to the most suitable methods of production and treatment. The best distance apart to plant any variety is a detail that has not received sufficient attention. We have been, up to the present, far too much inclined to assume that all trees should be planted alike. Larch certainly requires more open planting and treatment in its early years than Scots pine, oak or beech, and the same may be said of several other varieties. The principal factors are branch suppression, complete canopy, height growth, and survival of the fittest for mature crop. The persistency of side branches and their decay when suppressed varies so much with different trees that this fact alone points to the need for different treatment. The well-developed tree on the margin of a wood often pays better than the close-grown specimen further in, a fact which calls for more discussion and investigation, but this must not be construed as advocating too open planting.

Far greater care must be taken in future with the selection and treatment of the seeds before sowing and selecting the best of the crop of seedlings for planting. Heredity plays as important a part in trees as in animals, and selection of the fittest in the nursery would save considerable expense and disappointment in later years.

The compound interest argument is often advanced against planting, but, if the purely commercial aspect is to be considered, surely a better argument would be to apply compound interest to the present loss of return from many existing woods.

It is scarcely fair to judge forestry by much that has been done under that name in the past. Now that the outlook is much brighter and we can learn valuable lessons from our mistakes, is it too much to hope for far more attention and sympathetic consideration of the subject in the future? Only in recent years have the importance and possibilities of forestry been realised, and this accounts for its being the most neglected of all branches of rural economy. Many people who would otherwise take an interest in the subject are prevented from doing so by the difficulty of knowing how to begin. In the circumstances, one may be pardoned for suggesting that they should join the Royal English Arboricultural Society, the object of which is to encourage the subject and to apply the policy of "practice with science" to the production of trees in England.

THE FUTURE PRICE OF TIMBER.

The glutting of our markets with cheap foreign timber in the past had a fearful effect on the English timber and

underwood industries. It is important to consider what possibility there is of this recurring, since it must necessarily influence planting, especially as the price of our native supplies is largely governed by that of the imported timber. It is, of course, impossible to speak with any degree of certainty, when so many factors affect the question. Fluctuations are inevitable in every branch of commerce, but we can at least consider what the factors are and what is likely to be the trend of future prices.

It is here possible to deal with general principles only, and to discuss the matter in its broader aspects. Sir William Schlich and Professor Somerville have lectured on this subject, so that people desiring figures should consult some of their able reviews and articles.

We are continually reminded that it takes more than one generation to produce timber of good quality. This further emphasises the importance of considering the future price. Those who foresaw the present demand for rubber and for Cricket-bat willow and planted these trees may well congratulate themselves on their foresight. These are exceptional cases, but surely the same argument holds good. The long rotation necessary to produce a crop of timber must be borne in mind as illustrating how timber differs from other produce, such as wheat. In other crops an increased demand leads at once to the production of increased supplies, which on a short cycle quickly decreases price. Increased prices of timber will certainly open up new supplies, but the latter invariably accompanies other development to which reference is made later. From the long rotation necessary, timber as compared with wheat, &c., enjoys far greater freedom from glutted markets as a result of a rise in price. Therefore, if the extent of the existing supplies is known, it is easier to see in which direction future prices are likely to trend.

Although we have not yet sufficient data for a reliable estimate of the world's supplies of timber, we are to-day able to obtain a rough guide to the supplies in most countries. Scares of past years were dispelled by fresh supplies of foreign timber appearing from little-known sources.

If the general consumption of timber does not decrease, whenever we get within sight of the limit of existing supplies there is a point which sooner or later must have its effect, viz., the general cost of production.

Again, timber differs from wheat or similar crops since, as concerns the bulk of imported timber, the price has not been influenced by the cost of production. If the cost of production has not been taken into account, and we have not unlimited future supplies, then the low prices of the past are founded on an artificial and unsound economic basis.

In spite of iron, &c., having taken the place of wood for shipbuilding, as well as for constructional and other purposes, nearly every new invention brings a fresh demand for wood. Our imports of timber in 1906 were double the figures of twenty-five years before. It may be assumed that substitutes for wood will be found in increasing quantities, and also greater use made of preservatives to lengthen the life of timber. Creosote, &c., will, of course, increase the value of inferior and less durable timber. So far increased consumption in other directions has far more than counterbalanced any decreased consumption due to substitutes and preservatives. It seems improbable that the demand for wood for our industrial centres, and for all the general development at home and abroad, is likely to decrease to any extent in the near future. Our own consumption of timber has assumed tremendous proportions in recent years, and during the last generation we have consumed the timber production of centuries. In spite of the timber production in Germany, of which we hear so much, that country imports huge quantities of foreign timber.

As is common knowledge, development in new countries and colonies not only largely increases the consumption of wood, but also leads to the destruction of large timber supplies by wasteful lumbering and forest fires. The larger proportion of supplies in the west of America is now consumed on that continent, the development of the prairie provinces and of the pulp and other industries giving rise to a great demand for wood. The whole effect of development of agriculture and ranching is to consume the timber, to destroy the native supplies of timber, and also to stop natural reproduction through the exercise of grazing rights and other causes. Considering the rapid development of Canada during the last ten years, one may expect other countries to develop quickly in the near future. It seems impossible to estimate the consumption and destruction of timber likely to result therefrom.

It may be argued that steps now being taken to conserve the forests in various countries will result in increased supplies. The whole object of these measures is to prevent waste of existing supplies, and to ensure production of future supplies. Both Canada and the United States of America have now a large forest service, and other countries will follow suit. Norway and Sweden now impose restrictions as to a minimum age at which the timber can be felled and the steps to be taken for reproduction, and obviously these things must increase the price of the timber.

All persons interested in timber know that what is first quality to-day in nearly all foreign timber was third quality

twenty-five years ago. Yet the price of foreign timber during the past twenty-five years has increased enormously. Furthermore, authorities predict that third quality to-day will be first quality twenty-five years hence. Reasons already given substantiate this prediction, but there are also other points. Much of the foreign timber sent to our markets twenty-five years ago grew close to the sea-board and the railway, on the better valley soils, in accessible situations, and in many cases only the best timber was felled. Supplies obtainable under such favourable conditions are rapidly decreasing, as can be seen in the present quality and price of foreign timber. Future supplies are farther from the sea-board, in less accessible positions, necessitating heavy expense for transport, and the lumberman is now content to take the comparatively inferior timber. As against this, improved methods of lumbering and transport, and more organised marketing, have reduced expenses in some directions, but adverse factors have probably more than balanced this. Yet another indication of future higher prices is the tremendous increase in the prices and rents of timber limits. A generation ago, forest concessions could be obtained for the proverbial song. The following is an extract from a Forestry Journal of 1878: "Three hundred and sixty thousand acres of white oak and mineral land in Western Virginia were sold in New York the other day in large lots for about one cent. ($\frac{1}{2}$ d.) per acre." It seems almost impossible to think of land and timber ever again being obtained at such a figure.

Owing to the huge appreciation in value of the forests, a large sum has now to be paid for interest on capital, and on this increased value there are now large and increasing rates, taxes, and other impositions.

Although, higher prices will result in the increased use of substitutes, in many cases a reasonable advance in the price of timber makes little difference in the cost of the manufactured article. Wood is used in nearly every industry, but the cost of the finished product is influenced more often by labour and other expenses of manufacture than the exact cost of the wood. In other cases, by increasing the life of the timber by preservatives and introducing more economical methods of manufacture, a higher price for the timber can be easily afforded.

Again, more economical and scientific methods often lead to new uses for wood. A simple illustration of this is the batten ends purchased by workhouses for conversion into fire-lighters. The price of these has risen greatly owing to other present demand for making wood wool, suction gas and their products.

Although iron and cement may be used in place of wood, the use of wood in some form as a substitute for so many other

things increases tremendously with the march of science. Wood for paper pulp in place of rags has alone meant an enormous consumption of timber. The destructive distillation of wood opens up wonderful possibilities of further demand for wood. Wood becomes more valuable every day, through the by-products of its constituent elements, quite apart from its use as timber.

Independently of the increased prices which undoubtedly can be secured by better methods of marketing our timber, the general prospects are surely promising. Unbiased and independent consideration of these points must be convincing as to the need for encouraging forestry in this country.

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THE INTERNATIONAL INSTITUTE OF AGRICULTURE.

THE object of this article is to show what the International Institute of Agriculture is doing and what it hopes to do for agriculturists, and little space need be devoted to the story of how it came into existence. This story has already been told in "bluebooks," and can be read by any one interested. In January, 1905, H.M. the King of Italy addressed a letter to his Government giving a broad outline of a proposal to establish an International Institute of Agriculture, which had been suggested to him by Mr. David Lubin, a citizen of the United States. As a result of this letter communications were sent by the Italian Government to each of the Governments of the world, in which it was suggested that a diplomatic Conference should be held in Rome in May, 1905, to consider the matter. The Conference met, and a Convention embodying the results of its deliberations was signed on June 7, 1905, establishing the Institute and defining its objects. At that time the number of adhering States was forty, but the number has since been increased to fifty. The Institute was established as an official institution, and it is supported by grants from each of the adhering States. It is thus on an entirely different footing from other international associations and institutions which, although recognised by Governments, are nevertheless private institutions. The building in which the Institute is housed was the gift of the King of Italy, and is admirably suited for its purpose. The final direction of, and responsibility for, the work of the Institute, is vested in a General Assembly composed of delegates appointed by the contributing Governments,

but the executive body is the Permanent Committee which meets in the Institute constantly. Great Britain is represented on the Permanent Committee by Mr. H. G. Dering, Councillor at the British Embassy at Rome, who also acts as the representative of Australia, Canada, New Zealand, South Africa, India, and Mauritius. To Mr. Dering and to Sir Thomas Elliott, the late Secretary of the Board of Agriculture and Fisheries, who was one of the British delegates at the Conference in May, 1905, and has since taken a deep interest in the work and welfare of the Institute, agriculturists of the United Kingdom are greatly indebted for their constant and successful efforts to direct the work of the Institute into channels of the greatest utility to this country and the Empire.

OBJECTS.

The aim of the Institute is very different from that of any national Agricultural Department, inasmuch as what is only incidental to the work of the latter is the primary object of the former. When an agricultural department is established its main objects usually are (1) to administer laws relating to animal and plant diseases, land tenure, adulteration of agricultural produce, &c., and (2) to distribute grants for the promotion of agricultural education, experiments and research and other activities aiming at the development of agriculture. The collection and dissemination of information likely to prove of use to agriculturists is in most cases of secondary importance. With one or two notable exceptions the existing agricultural departments devote almost the whole of their energies to what may be described as "administrative work" and the collection of statistics. The demands of work of this type are so constant and so pressing that staff can rarely be spared for work which, though of immense importance, is of less immediate utility, viz., the collection and distribution of general scientific intelligence. It would surprise most agriculturists to know the small amount out of the total budgets of the agricultural departments of Europe which is expended on "intelligence" work, and even of this small sum by far the greater portion is expended in connection with the collection and publication of statistical intelligence. With the International Institute of Agriculture the position is entirely different. The Institute administers no laws, distributes no grants, employs no staff of inspectors, and expends no time on "Parliamentary Business." The staff is engaged almost wholly in collecting, collating and publishing information. So far as its work relates to agricultural statistics the function of the Institute is to co-ordinate and publish internationally information collected by each State nationally. On

the other hand, the systematic collection and dissemination of scientific information is seldom attempted by existing agricultural departments, and from every point of view there are excellent reasons for such work being done on an international basis, provided it is done well. The Institute is only in its infancy, but no one who has had the opportunity of examining and making use of its many publications is likely to deny that the work which it undertook to do, ambitious as most people thought it at the time, is being well done, and that there is every reason to believe that it will be still better done in the future.

The Convention of June 7, 1905, defined the principal duty of the Institute in the following words: "To collect, elaborate, and publish, with as little delay as possible, statistical, technical, or economic information regarding the cultivation of the soil, its production, whether animal or vegetable, the trade in agricultural products, and the prices obtained on the various markets." It is impossible to deal with each of its publications separately, but by taking the three heads, statistical, technical, and economic, it may be possible to indicate briefly the Institute's field of work.

AGRICULTURAL STATISTICS.

When Mr. David Lubin proposed to the King of Italy the foundation of the Institute, he had in his mind one main idea, viz., an official "single numerical statement" of the world's production of each important crop. He was familiar with the "single numerical statement" for the United States which had been published for some years by the U.S. Department of Agriculture. This statement shows at a glance how the production in each of the States of the Union and in the United States as a whole, compared with an "average" year. Mr. Lubin's idea was to arrange for the publication of a similar statement for each of the countries of the world, and for the world as a whole. As might have been expected in a project of this magnitude, the difficulties encountered were enormous, and, as a result of experience, the original scheme has been modified. Already, however, the Institute can point to some notable achievements. Several important producing countries which at the time the Institute began work had never published official crop reports, have now inaugurated systems which enable them to send reports to the Institute in accordance with a plan adopted by the General Assembly. A number of other countries have modified their systems of crop reporting so as to harmonise with the plan adopted by the Institute. Such results could not have been achieved by any other means than official international co-operation.

The first work undertaken by the Institute's Bureau of Statistics was to study the organisation of the agricultural statistical services in different countries, and the volume in which the results of these studies were published is a work of great value to any one interested in statistical method. In January, 1910, was published the first issue of the "Monthly Bulletin of Agricultural Statistics." This periodical is now published about the 20th of each month, in five languages, including English, and it contains information which cannot be obtained from any other source. The statements as to area, production and condition of crops are based on reports sent direct to the Institute from the Governments of the different countries. Moreover, for the purposes of comparison, the figures as to area and production are in each case expressed as a percentage of the similar figure for the preceding year. The work of organising such a service must have been very great, and the success which has already been obtained is surprising. The Canadian Ministry of Agriculture, in a circular letter issued to the Press early in 1910, prophesied that "the reliability of the statistical data supplied to the Institute by the several Governments will increase, so that in a reasonable time, the estimates of the crops from all the countries of the world, published by this Clearance House of statistical and agricultural information, will have much greater value than any heretofore published." No one will doubt to-day that the prophecy was a true one. Had the work of the Institute been confined to agricultural statistics, its establishment would have been justified, but it has other important duties to perform.

AGRICULTURAL INTELLIGENCE AND PLANT DISEASES.

In the words of the Marquis Capelli, its President, "the Institute probably receives, and, what is more, examines, a greater number of agricultural periodicals than any other institution in the world; and this monthly voyage, as it were, round the earth, passing in review all forms of cultivation and noticing all new ideas relating to agriculture, has an exceptional interest to all those who are engaged in agriculture." The results of the monthly review of agricultural periodicals are published in *The Bulletin of the Bureau of Agricultural Intelligence and of Plant Diseases*. When this Bulletin was first contemplated it was thought by many people that its aim would be very similar to that of the *Experiment Station Record*, which has been published for many years by the U.S. Department of Agriculture. As a matter of fact its aim is quite different. The American publication is a most useful, indeed an indispensable, index to the more important experimental work conducted throughout the world, although,

naturally, it deals principally with work done in the United States ; but for the most part it is little more than an index. The Institute's Bulletin, on the other hand, consists of lengthy summaries of all important reports and articles, and the reader will seldom feel the necessity of obtaining the original publication, and, as the summary is in English while the original may be in any language, the value of this will be evident. The Institute is enabled to publish such full summaries only because it confines its attention to matters which are absolutely new, important, and indicative of progress. The value of the bulletin may, perhaps, best be illustrated by giving the titles of three successive articles which appeared in the issue for September, 1912, the latest I have seen ; the articles are grouped according to subject, and the following are those given under the head " Feeds and Feeding " : (1) Methods for calculating the influence of the diminution in milk yield due to advance of the lactation period during feeding experiments—this being a summary of a report of an investigation published in a German periodical ; (2) A practical method of increasing meat production and of decreasing its net cost—from a French bulletin ; and (3) On the feeding value of potato haulms and berries—from a German weekly. The bulletin will be found a most valuable source of reference for the agricultural scientist and investigator, and of great interest to the practical farmer. The Bureau of Agricultural Intelligence and of Plant Diseases has also issued separate publications on the protection of birds and on dry farming. When it first began to summarise articles and reports from agricultural periodicals it was thought that the summaries could best be published on a geographical basis. This plan was abandoned and the monthly bulletin above described was started. One volume, however, has been issued in accordance with the first plan and it deals with Great Britain. This is a unique work consisting of 640 pages, and it reviews the whole of the important publications issued in 1910 dealing with the science and practice of farming in Great Britain.

AGRICULTURAL CO-OPERATION, INSURANCE, AND CREDIT.

There are subjects in which agriculturists in Great Britain have much to learn from other countries, and the publications of the Institute serve a useful purpose in bringing together the scattered information of all countries. With regard to co-operation and allied movements, even in this country, its publications give in a readable form information which is by no means easily accessible. The principal publication on this subject is the *Bulletin of the Bureau of Economic and Social Intelligence*. This bulletin is conducted

on entirely different lines to that dealing with agricultural intelligence. The first three issues, published in 1910, contained comprehensive studies on agricultural co-operation and credit in all the important adhering States. They became, however, quickly out of print, and the information was re-published in two volumes (one of which has not yet been issued), entitled *Monographs on Agricultural Co-operation in various Countries*. These monographs are absolutely indispensable to any one studying agricultural co-operation. It is true that most of the information given can be found elsewhere, but the advantage of having all the facts, extracted from innumerable publications, official and otherwise, given for each country on an uniform system and in the English language, cannot be exaggerated. These early studies formed a firm basis on which to build later numbers of the bulletin. The subsequent monthly issues contain recent news, summarised from current reports and periodicals, and in addition monographs on different subjects based on the study of a number of official reports and other publications. The bulletin also gives information regarding legislation proposed or passed in different countries. The Bureau has also recently published in French its first International Yearbook of Agricultural Legislation, which supplies information with regard to the principal laws relating to agriculture passed in 1911 throughout the world.

THE LIBRARY.

From the above account of the activities of the Institute, it will be gathered that the centre of the whole organisation is the Library. It is only because its Library has been conducted from the first on a scientific and efficient system that the Institute has been able to accomplish the work it has. In May, 1911, the President stated that at that time over seventeen hundred reviews and periodicals were being received, and that every day fresh ones were arriving. The weekly bibliographical bulletin published by the Institute testifies to the thoroughness with which these periodicals are examined and their contents noted.

The above is a brief and imperfect account of the work of the Institute, but it may be sufficient to show what an important institution it is and what an influence it is likely to exert on the agriculture of the world. Specimens of each of the publications of the Institute may be seen at the offices of the Board of Agriculture and Fisheries, and copies of most of them may be purchased from there. Copies can also be consulted by members of the Royal Agricultural Society of England, at the Society's library.

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CONTEMPORARY AGRICULTURAL LAW.

I.—LEGISLATION.

AT the time of writing this article the completed legislation of 1912 was very small in quantity, and had very little bearing on agriculture or agricultural interests. The only Act of Parliament that it appears to be material to notice is the Finance Act, 1912 (2 and 3 Geo. 5 c. 8). Section 4 of that Act enables the Commissioners of Customs and Excise to authorise responsible persons, duly licensed to grow tobacco within the United Kingdom, to grow tobacco for the sole purpose of obtaining an extract therefrom, to be used without payment of duty, in the manufacture of insecticides or sheep-wash, or for other purely agricultural or horticultural purposes. The authority is to be granted subject to such security and the observance of such regulations and conditions as the Commissioners may prescribe, and if any person so authorised acts in contravention of or fails to comply with any of those regulations or conditions, the article in respect of which the offence is committed will be forfeited and a penalty of 50*l.* is imposed.

Section 9 of the same Act provides for estate duty on timber or underwood payable on the death of a person dying after April 30, 1909, in substitution for the first paragraph of Sub-section 5 of Section 61 of the Finance (1909-10) Act, 1910. The value of such timber or underwood is not to be taken into account in estimating the principal value of the estate or the rate of estate duty (as was required by Section 61, Sub-section 5, of the Act of 1910), and estate duty is not to be payable thereon, but is, at the rate due to the principal value of the estate, to be payable on the net moneys (if any) after deducting all necessary outgoings since the death of the deceased, which may from time to time be received from the sale of timber trees or wood when felled or cut during the period which may elapse until the land on the death of some other person again becomes liable to estate duty. This is a concession in favour of owners of woodland and will make it unnecessary to include standing timber in the valuation of land for the purposes of estate duty.

Section 10 of the same Act amends Section 2, Sub-section 3, of the Finance (1909-10) Act, 1910, in respect of the ascertainment of the original site value of land for the purposes of duties under the Act. It provides that the substitution allowed by Section 2, Sub-section 3, of the Act of 1910 for the original site value as ascertained under the Act, of the site value at the

time of any transfer on sale of the fee simple or of any interest in the land which took place at any time within twenty years before April 30, 1909, shall apply to the case of any transfer on sale of the fee simple or of any interest in the land which took place between April 29, 1909, and the date of the commencement of the Act (April 29, 1910), or took place after the commencement of the Act in pursuance of any contract made before the commencement of the Act.

Some important bills affecting agriculture, such as the bill for amending the Agricultural Holdings Act, 1908, in respect of notice to quit, and the Milk and Dairies Bill, have been introduced into Parliament, but it is uncertain at present if they will be passed into law.

II.—DECISIONS OF THE COURTS.

1. *Labour.* It must again be stated that decisions under the Workmen's Compensation Act, 1906, have been very numerous, but now, as in former years, employers of labour in agriculture appear to have been fortunate in requiring the assistance of the Courts in dealing with claims by their workmen less frequently than employers of other classes of labour. It will only be necessary to notice a few of these decisions which may be applicable in cases of claims by agricultural labourers for compensation under the Act. In the Irish case of *Greene v. Shaw* (1912, W.C.C., 25), a herd was employed to look after cattle upon two farms, and usually rode a bicycle in going from one farm to the other. One evening when he had mounted his bicycle for the purpose of visiting one of the farms to see the cattle, a young sheep dog, his own property, ran in his way, with the result that he was thrown from the bicycle and fatally injured. It was held that the accident occurred "in the course of," but did not arise "out of the employment" of the workman, and therefore his representatives were not entitled to compensation under the Act. In *Parker v. Hambrook* (1912, W.C.C., 369) the vexed question of the liability for accident suffered by a servant who has disregarded his master's instructions, given for his own protection, was considered. The workman was ordered to dig for flints on certain land at Drellingore Farm for his master, who was a farmer and traction engine proprietor, and agreed to pay in proportion to the quantity of flints raised. The workman was forbidden to work in a particular part of the pit which was known to be dangerous. Notwithstanding his orders he worked on the day in question in this part as it was richer in flints than other parts, and also more sheltered from rain. He was overwhelmed by a fall of earth from the side of the pit and killed. It was held that since his working in the forbidden part of the

pit had been entirely for his own purpose, he had put himself out of the ambit of his employment and that his widow was not entitled to compensation under the Act. *Tombs v. Bomford* (1912, W.C.C., 229) illustrates the liability of a farmer in respect of casual labour. There a labourer, whose garden adjoined the land of a farmer, complained that the garden was injured by a hedge on the farmer's land and asked him to have it cut. The farmer, to oblige the labourer, agreed that the labourer should cut the hedge and be paid 10s. for the work, and that the farmer should have the long poles from the hedge for use in his hop-ground. While cutting the hedge the labourer met with an accident to his eye, which caused him to lose the sight of that eye. It was held that the labourer's employment, though of a casual nature, was "for the purpose of the employer's trade or business," and that he was therefore a "workman" and entitled to compensation under the Act from the farmer for the accident. In *White v. Wiseman* (1912, W.C.C., 403; 28 Times L.R., 542) it was held that in calculating the average weekly earnings of a workman for the purpose of awarding compensation under the Workmen's Compensation Act, 1906, the Court must not disregard days, or parts of days, during the twelve months preceding the accident in which there was a shortage of work so that the employer was unable to find the workman any work to do. *Polled v. Great Northern Railway* (1912, W.C.C., 379) shows that where a man meets with a fatal accident his wife and child can only recover compensation for the loss as "dependants" if it is proved that they were in fact wholly, or in part, dependent on his earnings at the time of his death. A wife who has been separated from her husband for three years before his death and has wholly maintained herself and her child, is not, nor is the child, a "dependant" of the deceased workman.

2. *Stock*. In *Glover v. Robertson* (10 L.G.R., 230; 106 L.T., 135) a curious point arose under the Diseases of Animals Act, 1894. Under that Act the Board of Agriculture and Fisheries has made an Order prohibiting the entry into a port in Great Britain, excepting under license of the Board, of cattle, sheep, goats, or swine "brought from" a port in any of the countries named in a schedule to the Order, which includes France but not India. A steamship took on board at Calcutta a number of live sheep to be used as food by the Lascar crew. She put into various ports on her voyage home, the last being Marseilles. On leaving Marseilles she had a live sheep from Calcutta on board, which was still on board when she berthed in the Albert Docks. It was held that the sheep in question had been "brought from" Calcutta and not from Marseilles, and the master of the ship had not been guilty of a breach of the

Order of the Board of Agriculture and Fisheries by bringing the sheep to this country without a licence.

In the Scottish case of *Williamson v. Stewart* (1912, S.C., 235) the question arose as to the proper method of valuing sheep stock left on the farm for the landlord or incoming tenant according to the custom common on hill farms in the North of England and Scotland. It appeared that generally the valuations of sheep stock as between an outgoing tenant and the proprietor or incoming tenant in Perthshire and many other parts of Scotland have according to a recognised and well-established custom been invariably conducted on the principle termed "use and wont" of putting an acclimatised or "hefting" value upon the regular sheep stock beyond the value which they would have if removed and sold off the land because they have a higher value to the proprietor or incoming tenant who is to continue to hold them on the farm. The reason for such higher value being placed on the stock was said to be that sheep bred and retained on land are known to settle, live, and thrive better than strange sheep brought on the same ground, while at the same time they are less expensive to herd as they seldom stray from their own ground. The Court held that the valuation should proceed not on market value alone, as contended by the landlord, nor on "use and wont" by adding a percentage to market value to represent acclimatisation value as contended by the tenant. The proper method of valuation was held to be that the arbiter should consider the farm as he finds it, and fixing in his own mind a fair rent for the farm as a first expense should then go on to consider what the incoming man can afford to pay for the stock as it exists in view of what prices he will eventually get in the market for wool, lambs and sheep, when the component parts of the stock, as a going stock, will be sold from time to time. This view allowed for a value in which had been included acclimatisation, the crucial question being whether after he has paid a rent the incoming man could at such prices make the farm pay as a going concern.

In the Scottish case of *Oranston v. Mallow* (1912, S.C., 112) a horse was sold under a warranty that it was a good worker and sound in wind, and the purchasers bargained that they should have a week's trial. It was held that the contract was one of sale under warranty and not one of sale on approbation, and accordingly that the purchasers were entitled to reject the horse within the week if it did not conform to the warranty but not otherwise. They had no absolute right of rejection within the week without assigning any ground.

3. *Landlord and Tenant.* There have been some noticeable cases on the general law of landlord and tenant in 1912.

In *Re Searle, Brooke, and Searle* (1912, 1 Ch., 610 ; 81 L.J.Ch., 375) a tenancy "for two years certain and thereafter from year to year until either party shall give to the other" notice to quit was held not to be determinable at the end of the second year, but only by giving notice at the end of the third or any subsequent year. In *Rudd v. Bowles* (1912, 2 Ch., 60 ; 81 L.J.Ch., 277) certain leases were executed in May, 1903, and bore date at the time of execution "1903," the day and month being left in blank. By arrangement between the landlord and tenant the dates were subsequently inserted as of July, 1904, the figure 3 in the lease being altered to 4 for that purpose. Notwithstanding the rule of law that a deed will be avoided by a material alteration it was held that the alteration having been made with the consent of both parties did not make the lease void. In *Printing Machinery Co. v. Linotype & Machinery, Lim.* (1912, 1 Ch., 566 ; 81 L.J.Ch., 422) a claim for reetification of a lease on the ground of mistake was held to be a matter that did not come within the arbitration clause referring any dispute, difference, or question between the lessors and lessee to arbitration but should be decided by the Court. *Cresswell v. Jeffreys* (28 Times L.R., 413) was a case of distress. The tenant of a farm was in arrear with his rent. The plaintiff in the action had cattle grazing thereon. The landlord instructed a bailiff to distrain for the rent due, and the fact that a distress was likely to be levied came to the knowledge of the plaintiff, who had a conversation with the bailiff and said he would move his cattle off the farm. The bailiff said, "Don't be such a fool. I can't touch your cattle because you took the keep by auction." Thereupon the plaintiff, believing his cattle to be safe, took no steps to remove them, but when a distress was levied four of them were seized. In an action for wrongful distress the jury found that the bailiff or landlord led the plaintiff to believe that he was not going and had no right to levy distress on the plaintiff's cattle. It was held that the bailiff's statement was either a mis-statement of law or a declaration of intention to abandon a legal right to distrain, and that in neither case could it create an estoppel so as to make the distress unlawful.

In *Re Derby (Earl) and Ferguson's Contract* (1912, 1 Ch., 479 ; 81 L.J.Ch., 567) a tenant had planted land with bush fruit with the written consent of his landlord, thereby acquiring a right to compensation under the Agricultural Holdings Act, 1908, Section 2. The landlord sold the land under conditions which provided that the purchaser was to be deemed to have notice of and to take subject to the terms of all the existing tenancies, but no express notice was given as to the tenant's right to compensation for the fruit bushes. It was

held that on the termination of the tenancy the obligation to satisfy the tenant's claim to compensation fell on the purchaser, and not on the vendor. The County Court case of *Osborn v. Herdman* (47 L.J., 466) deserves notice. In that case a claim for compensation for disturbance by a tenant under Section 11 of the Agricultural Holdings Act, 1908, was made, and the question was whether the notice to quit had been given "without good and sufficient cause, and for reasons inconsistent with good estate management." It appeared that at the time of giving notice the landlord intended to build bungalows on the land, but he subsequently changed his mind and sold the land. It was held that the landlord's reason for determining the tenancy being to obtain a larger income out of the land was a good and sufficient cause for giving notice and one not inconsistent with good estate management, and that the tenant's claim therefore failed.

4. *Produce.* There have again been several cases relating to the sale of milk. In *Williams v. Friend* (1912, 2 K.B., 388; 81 L.J.K.B., 756) a dairyman sold to a purchaser cream mixed with a preservative. Nothing was said at the time of sale, but opposite the entrance to the shop a notice was exhibited that all cream sold at the establishment contained a small portion of boron preservative to keep the cream "sweet and wholesome." He was charged under Section 6 of the Sale of Food and Drugs Act, 1875, with having sold "to the prejudice of the purchaser" an article of food which was not of the nature, substance, and quality of the article demanded by him. It having been found that the purchaser had seen and read the notice, it was held that the sale was not a sale "to the prejudice of the purchaser," and that for the purposes of Section 6, the fact that the added matter was found to be injurious to health was immaterial. It was, however, pointed out that proceedings may be taken under Section 3 of the same Act if reliance is intended to be placed upon the unwholesome character of an ingredient added to food. In *Preston v. Redfern* (10 L.G.R., 717; 76 J.P., 351) proceedings were also taken under Section 6 of the same Act against a vendor of milk where the public analyst had certified that a sample of milk purchased from him contained 12 per cent. of added water calculated on the standard prescribed by the Board of Agriculture in the Sale of Milk Regulations, 1901 (viz. 8.5 per cent. of milk solids other than milk fat). The vendor called no evidence in contradiction of the certificate, but contended that the deficiency in milk solids was due to causes other than the addition of water. The Justices applied their own knowledge and were of opinion that the deficiency in the standard prescribed might be due to causes other than the abstraction of solids or the

addition of water and refused to convict. The Court held that in the absence of evidence in contradiction of the analyst's certificate the Justices should not have used their own knowledge but should have convicted.

Retail Dairy Co. v. Clarke (1912, 2 K.B., 388 ; 81 L.J.K.B., 845) was a case of warranty in which it was held that a warranty of the purity of milk will be available as a defence under Section 20, Sub-section 1 of the Sale of Food and Drugs Act, 1899, if a copy of it with written notice of the intention to rely on it is put into the post within the seven days after service of the summons mentioned in the section, although not received by the purchaser to whom it is sent until a later date. In *Thomas, Lim., v. Houghton* (1911, 2 K.B., 959 ; 81 L.K.J.B., 21) where there was a continuing warranty of the purity of milk, it was decided that the six calendar months limited by Section 11 of the Summary Jurisdiction Act, 1848, for laying an information for giving a false warranty ran from the date of each delivery and not from the date of the original warranty. In *Jackling v. Carter* (10 L.G.R., 632) the warranty of purity was ambiguous in its wording. It was as follows : "The said S. S. & G. Dairies, Ltd., purchase all milk sold by them under a warranty of its purity from the farmers, and agree to put the same on rail thoroughly well cooled over a refrigerator, and guarantee it as such up to the time of delivery at the above address." This was held to be a warranty of purity of the milk as delivered at the dealer's address, upon which he was entitled to rely under Section 25 of the Sale of Food and Drugs Act, 1875, and not merely a guarantee that the milk should arrive "thoroughly well cooled over a refrigerator."

5. *Small Holdings*. A case under the Small Holdings and Allotments Act, 1908, deserves notice having regard to the activity now shown by County Councils in providing small holdings under the Act. In *Re Evans and Glamorganshire County Council* (10 L.G.R., 805) a County Council had purchased land for the purposes of the Small Holdings and Allotments Act, 1908, and the tenant of the land under his agreement with the Council became entitled to "such compensation for the loss or expense directly attributable to the quitting which the tenant may unavoidably incur upon and in connection with the sale or removal of his household goods and his implements of husbandry, produce, and farm stock on or used in connection with the land as he would have been entitled to under the Small Holdings Act, 1910, if his tenancy of the said farm had been terminated by a notice to quit as in the said Act stated." Questions arose as to the items for which he could obtain compensation under the above-mentioned Act, which it may be noted is, as regards the subject matter of compensation,

identical in terms with that part of Section 11 of the Agricultural Holdings Act, 1908, which deals with the compensation for disturbance which may be obtained by a tenant whose tenancy has been terminated "without good and sufficient cause, and for reasons inconsistent with good estate management." It was held that the compensation payable to the tenant included compensation in respect of loss sustained by him by selling the stock by public auction instead of upon a valuation, and in respect of the cost of supplying refreshments to those attending the auction, which the umpire had found was customary and desirable at agricultural auction sales. A fee paid by the tenant for settling an agreement between himself and the County Council was disallowed, and also a fee paid by him for valuing the stock before the sale, but it was suggested that the last-mentioned fee might be allowed on the reference to arbitration of the tenant's claim as part of the costs of reference.

6. *Miscellaneous.* Under this head some cases should be noted.

In *Martin v. Great Eastern Railway* (1912, 2 K.B., 406; 81 L.J.K.B., 825) the plaintiff claimed to recover under the Railway Fires Act, 1905, for damage caused to agricultural land and crops belonging to him at Trumpington in the county of Cambridge by fire arising from sparks or cinders emitted from locomotive engines used on the defendants' railway adjoining his land. His action failed because he did not comply with the requirements of Section 3 of the Act by giving notice and particulars of damage in writing to the railway company within seven days of the occurrence as to the notice of claim, and within fourteen days as to the particulars of damage. He had, in fact, sent notices of the occurrence to the railway company, but had not stated the amount of damage claimed in money within the prescribed time. Mr. Justice Channell, before whom the case came, held that the notice was a condition precedent to the Act applying, and must contain a statement of the amount claimed in respect of damage.

Rex v. Preston Rural Council (10 L.G.R., 238; 106 L.T. 37) was a case where bye-laws of a District Council provided that any person erecting a new "domestic building" should provide in the rear of it an open space. The Council refused their approval of plans of a farmhouse and barn erected as one building, because they considered the barn ought to be erected separately from the dwelling-house so as to allow air space between them. It was held that they were wrong in doing so as the farmhouse and barn were one "domestic building" and the plan showed the necessary air space on every side,

The case of *Cope v. Sharpe* (1912, 1 K.B., 496 ; 81 L.J.K.B., 346), the decision of which by the Divisional Court was noted at page 196 of Vol. 71, Journal R.A.S.E., has come before the Court of Appeal. The question was whether a tenant of sporting rights, in order to protect those rights when they were threatened by a fire on land adjoining that over which his rights extended, might legally set on fire patches of heather to the leeward of the fire, so that when it spread to those patches it should be checked for want of fuel. The Court of Appeal held that to justify a trespass on the ground that intervention was necessary in order to prevent destruction of property it need not be shown that if the intervention had not taken place the property would have been destroyed or injured. It is sufficient to show that the intervention was, in the circumstances at the time when it took place, in part reasonable. This principle is applicable in the case of any acts done by an occupier or owner of land to protect his land from threatened injury. As the defendant in *Cope v. Sharpe*, in setting fire to the heather, had done what, at the time when he did it, was reasonably necessary in the circumstances, the court gave judgment in his favour, although in the result his act turned out to be unnecessary, as the fire was in fact extinguished independently of what he did.

In the case of *re Trevor-Battye's Settlement ; Bull v. Trevor-Battye* (1912, 2 Ch., 339 ; 81 L.J.Ch., 339) the proceeds of sale of beech trees cut on an estate in Buckinghamshire, according to the course of management usual in the neighbourhood, were held payable to the tenant for life as "profits" of the estate after paying thereout all costs of replanting and repairing fences, no portion being liable to be invested as capital.

Kynoch, Lim., v. Rowlands (1912, 1 Ch., 527 ; 81 L.J.Ch., 340) was a case in which the ownership of land was in dispute, and the defendant claimed to have acquired a possessory title under the Real Property Limitation Act, 1883. It appeared that his cows, when grazing in his own field, used also to graze on the land in question, between which and his own field there was no boundary fence, but it was held that the mere straying of cattle over a known boundary by reason of there being no fence is not an act of such exclusive possession as will enable the trespasser whose cattle have so strayed on to land of an adjoining owner to acquire a statutory title as against the true owner.

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THE KENT COMMERCIAL FRUIT SHOW.

THE Kent Commercial Fruit Show is a serious attempt to standardise and improve the packing and marketing of British grown fruit. The Show, which was first held at Ashford, Kent, in 1911, is managed by a committee of twenty-seven commercial fruit-growers, whose names are evidence of the business character of the undertaking; the chairman is the Principal of Wye College, and one of the college horticultural staff acted as a most successful secretary. The classes, numbering seventeen, are open in some cases to the whole of the British Isles and in others to only Kentish growers, and comprise exhibits of apples packed in the Fruit Growers' Federation standard boxes, of new varieties of apples, of bottled fruit, and of fruit trees. At Ashford the number of exhibits was 230, including boxes, whilst at Maidstone the exhibits totalled 227, including 1,147 boxes (about 20 tons of fruit). The Show will be held next year at a centre where considerably more accommodation will be required, as it is proposed to include in the schedule classes for cooking apples in barrels, a package which is more suitable for such varieties than the box. The intention of the promoters of the Show is not to advocate boxing of apples for all varieties, but to emphasise the importance of marketing British apples under conditions as favourable as Colonial and Foreign fruit. Hitherto, British apples have been sold in bushels or half-sieves in a more or less higgledy-piggledy condition as to grading, and the salesman is somewhat inclined to advocate the continuance of this system (?), and the opponents of the boxing system, who are rapidly being reduced in number, claim that the box is not a suitable package for British fruit on the score of the cost of the box, the labour of packing, and the hesitation of buyers to accept such a package; others urge that the size of the box is unsuitable, the "bulge" is unnecessary, the fruit is seriously damaged by the rough methods of railway servants in handling the boxes, but some of these objections are details which can be adjusted as the method becomes more generally adopted. It is a somewhat trite saying that what this generation ridicules, the next generation accepts and the third generation considers indispensable, and any innovation is subject to such treatment. It is a fact, however, that the quality of British fruit is not properly appreciated by the "man in the street" who is accustomed to the orderly and tempting packages of Colonial fruit; but once the English consumer "gets his teeth" into an

English apple to which he has been attracted, possibly by the method of packing and of display, it may be confidently asserted that he will always demand English grown fruit.

But if this system of boxing is to be successful, the Commercial Fruit Shows already held have shown that there are several cardinal points to be emphasised.

1 First, as to the varieties of apples which are worth boxing. First class, well-coloured fruit of the following varieties :— Worcester Pearmain, Alington Pippin, Blenheim Orange, Bismarck, moderate sized Newton Wonder, Wellington, James Grieve, Beauty of Bath, Winter Queening, Gascoynes Scarlet, Cox's Orange Pippin, show best in boxes ; whilst Bramley's Seedling, Lanes Prince Albert and similar types of apple are unsuitable for this method of display.

2 Second, as to the method of packing. Should the fruit be packed bare or with wood wool or some other packing material ? The use of packing material obscures the appearance of the fruit, and may render the package untidy, and if the apples are properly packed they will travel well without such padding. The great object is to secure the proper degree of tight packing—if packed too tight, then the process of packing will cause bruising ; if packed too loose the fruit will bruise by concussion in transit. It is the custom to pack American and Colonial apples with a "bulge" ; that is, the fruit is so packed that the top and bottom of the box are somewhat convex, to ensure the tightness of the fruit inside the box. Unless railway companies will load and unload such boxes on their sides, bruising is bound to result, but shipping and railway companies know how to handle imported fruit, and they must be taught how to handle home grown fruit. The packing of many of the exhibits at the Kent Fruit Show was certainly not perfect, but showed a very great advance on that of the preceding year—the number of badly packed boxes being considerably smaller whilst the best packed boxes were of a much higher standard.

Thirdly, the boxes must be non-returnable. Every commercial grower knows the difficulties of getting back empties, and the complications of accounts which may be engendered by the use of a returnable box are not worth the growers' attention, and also in the case of a box which is nailed, it is almost impossible to use it a second time with advantage.

It will undoubtedly be some time before the market is accustomed to English boxed fruit, but the success of the imported boxed fruit is an established fact, and there is no reason why this should remain a monopoly.

or The question of the best commercial package for apples is certainly open to discussion ; it is not dogmatised that the box will always be the best, but of the packages suggested up to the

present the box presents the least number of objections, whilst for pears the half box is the most suitable package.

If the box method, or any method of packing is to be successful, absolute honesty on the part of the packer is necessary; the apples must be uniform in size and quality throughout the box, and there must be no "topping" or the putting of the best fruit in the outside layers with inferior fruit below.

The cost of box and packing is calculated at 7d.—8d.

| | |
|-----------------------------------|--------------|
| Cost of box | 5d. |
| Packing (approximately) | 1½d. per box |
| Making up | 2s. per 100 |

At the Show the exhibits were judged by men experienced in the growing of apples and also by fruit salesmen. Marks were awarded for the different characteristics of the exhibits, and the "score card" used by the judges contains the following allocation of 100 points:—

| <i>Fruit.</i> | | <i>Packing.</i> | |
|---------------------|----|-------------------------------|----|
| Size | 25 | Uniformity of grading | 10 |
| Colour | 15 | Quality of pack | 20 |
| Condition | 20 | General appearance | 10 |

The Kent Commercial Fruit Show has certainly made it plain that the growers are willing to adapt their methods to modern requirements; the demonstration of packing was attended by crowds of spectators, and the interest evolved was such that the Committee have decided to institute a packing competition at the next Show. The quality of the fruit exhibited was admitted, even by the Colonial grower who attended the Show, to be magnificent, in spite of such an unfavourable summer as that of 1912. All the conditions, in fact, seem favourable in the extreme for putting our British grown fruit in the front rank as regards the home consumer, and even of obtaining an export trade (during 1912 some 100 tons of Kentish fruit in boxes were exported to South America), and it is hoped that this is but the beginning of a movement of immense value to the proper organisation and conduct of the fruit growing industry of the United Kingdom.

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AN EXPERIMENT IN MUTUAL ASSURANCE.

MUTUAL assurance against fire and other losses is a frequent subject for discussion, and so long as the expenses and the dividends of the great Insurance Companies account for anything from 30 to 50 per cent. of their premium income it seems obvious that if a scheme for mutual assurance could be devised upon lines financially sound, it would be very much in the interests of the insured for them to adopt it. The difficulties in the way of such a scheme are, however, very great, and the various attempts which have been made in this direction have for the most part ended in insolvency, or, where successful, in the absorption of the enterprise in the Tariff Ring. This latter fate recently overtook a company doing a very considerable business on the principle of returning to the insured a proportion of the premiums paid, where no claims had been made. In another case, every person insuring must also be a shareholder, but as the shares taken up do not provide sufficient capital for adequately financing the company, the greater portion of all risks are re-insured on Lloyd's, and there is nothing mutual about this. Again, an Agricultural Co-operative Trading Society doing considerable business in the Midlands has solved the problem by constituting itself an agent for one of the large Tariff Companies, but such an expedient is only recorded to show that the difficulties in the way of mutual assurance for farmers are very great, and that so far they do not appear successfully to have been overcome in any single case. The difficulty is, of course, one of finance, and as the attempts to form capitalised mutual concerns to deal with agricultural insurance business all over the country can be said to have failed, it may be of interest to describe an experiment now being carried on in North Lincolnshire by which it is hoped to secure to the farmer all the profits of insurance, whilst giving him, at the same time, adequate security against loss. Though the area covered by this scheme is necessarily limited, there is no limit to the number of areas in which it could be put into operation.

The association referred to started work about twenty-six years ago as a Glanders Insurance Association, to insure its members against losses from glanders. The outstanding feature of the association was that it had no capital, neither paid-up nor nominal, and that its members paid nothing in the way of annual premiums. Where a loss was incurred, a levy was made upon all members, according to the acreage of their holdings, to compensate the member suffering the loss.

The full working of the association can readily be gathered from its rules :—

THE BINBROOK AND DISTRICT
GLANDERS INSURANCE ASSOCIATION.

RULES.

1.—The Association shall be called “The Binbrook and District Farmers’ Insurance Association for protection against loss through Glanders.”

2.—A Chairman, Two Vice-Chairmen, Secretary, and Treasurer, with Five other Members, shall be chosen annually, and constitute the Committee, of which Five shall be a Quorum.

3.—The objects of the Association shall be to compensate Members of the Association against losses after the Local Authority has ordered the slaughter of any horse or horses suffering from Glanders.

4.—After the Disease called Glanders has broken out in a farm stable or other place, the owner (being a member) of the said horse or horses shall immediately give notice in writing to the Secretary of the Association, who shall at once communicate by writing to every Member of the Association, and also call a General Meeting.

5.—The Association shall each year appoint two Valuers at their Annual Meeting, one of whom shall act on behalf of the Association ; in case the outbreak be on both Valuers’ farms, the Secretary to act upon Rule 4.

6.—When the Local Authority has ordered the slaughter of a horse or horses suffering from Glanders, the Association shall send their Valuer to meet another Valuer appointed by the Owner of such horse or horses suffering from the Disease of Glanders, and in case of their not agreeing they shall appoint an Umpire, who with themselves shall be Members of the Association, and their decision shall be final.

7.—Each Member shall pay an entrance Fee of 6d. for every 50 acres or portion of 50 acres in his occupation. It is imperative that a Member must enter the whole of his occupation both within and without the district.

8.—There shall be no annual subscription or payment, but when a case of Glanders has broken out and the Local Authority has ordered the slaughter of any horse or horses belonging to a Member of this Association, a call of a rate per acre upon the whole of his occupation shall be made upon each Member, as shall be deemed necessary, added to any sum paid as compensation by the Local Authority, to cover Three-fourths of the value of such loss. The maximum value of any horse shall not be put above £60.

9.—No person shall be considered eligible to become a member of this Association who occupies, either as Owner or Tenant, less than 100 acres of land, nor shall any person become a Member whose principal business is that of a horse dealer, or has a place of business for the slaughter of diseased horses, beasts, sheep, or pigs.

10.—The Committee reserve to themselves the right of accepting or refusing any applicant for Membership of this Association.

Very few claims were made upon the Association ; in fact, in recent years, it has only been kept alive with a view to the extension of its operation by the inclusion of other risks, should occasion arise. The opportunity for expansion presented itself last summer, consequent on the action of the Tariff Offices in raising the rate for insurance against employers’ liability, and the Glanders Association was reconstituted as follows :—

THE BINBROOK AND DISTRICT GLANDERS INSURANCE ASSOCIATION at a General Meeting, held on June 21st, having agreed to change the name

to "FARMERS' ASSOCIATION," and to include Mutual Insurance against Employers' Liability for Workmen's Compensation, and having appointed a Committee to meet on June 26th, the following New Rules were adopted :—

RULES.

1.—That the Committee should approve of each person before becoming a New Member, who should occupy not less than 400 acres of land.

2.—This Association's year commences April 6th, 1912. Any Member wishing to resign must give at least six months' notice prior to the next April 6th.

3.—All members will be themselves responsible for any accident occurring to their employees to the sum of £3; any special cases must be brought before the Committee to be dealt with.

4.—That each case as it arises shall be reported to one of the Secretaries, who shall call a Committee Meeting if necessary.

5.—A rate per acre shall be levied at the end of each year on all land unless a large claim has to be met within the year.

6.—This Association includes farm labourers, blacksmiths, carpenters, machine-men, grooms, and domestic servants on any Member's Farm.

7.—The Annual Meeting to be called on Louth April Fair Day in each year.

The object of Rule 5 is to obviate the necessity for repeated levies for small losses. If no loss be incurred by the members throughout any year, no levy at all will be made in respect of that year.

There are thirty-nine members, and they occupy between them about 40,000 acres. This area has been adopted as the limit of the Society's operations, anyhow for the present, and it is expected that it will be sufficiently large to allow the laws of average to apply, whilst not being so extensive as to necessitate any professional clerical work.

It is not yet possible to estimate the measure of success, or otherwise, which may attend the venture, but in spite of the warnings of the local Tariff Offices, the members of the Association are very sanguine. If their expectations are realised, there is no reason why the system should not spread to other districts, and expand to cover other risks. To fulfil this latter object, however, it might be necessary to take in a far larger area, and to employ clerical assistance, as fire risk, for example, on these large farms, might involve the members in very serious liabilities. Insurance against hail, too, could only be undertaken by a much larger association of persons interested, for hail storms are very local, and a small society might find itself in the position of the members of the community who subsisted by taking in each other's washing. Still, there are great possibilities about this venture, and not its least interesting feature is the fact that it is an example of spontaneous combination and co-operation by a body of farmers, a thing as rare as it is desirable.

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REPORT OF REFEREES ON THE ESSAYS SENT IN FOR THE ROYAL AGRICULTURAL SOCIETY'S RESEARCH MEDAL.

THE following essays were submitted to the referees:—

Gavin, William, B.A., Trinity College, Cambridge. *The Interpretation of Milk Records.*

Hammond, John, B.A., Downing College, Cambridge. *An Investigation Concerning the Food of Certain Birds.*

Robinson, Gilbert Wooding, B.A., Gonville & Caius College, Cambridge. *Survey of the Soils and Agriculture of Shropshire.*

Shildrick, Lancelot R., B.A., Emmanuel College, Cambridge. *Alkali Soils of the Kharjeh Oasis.*

Stokes, Edgar Edward, Midland Agricultural & Dairy College, Kingston, Derby. *Some Causes of Infertility in Peaty Soils.*

The referees beg to report as follows:—

Three of the essays sent in represent serious and successful pieces of work, viz., the essays of Messrs. Gavin, Hammond, and Robinson. Their very diverse character makes it somewhat difficult to judge their respective merits.

Mr. Gavin, who holds the position of Scientific Expert to Lord Rayleigh's Dairy Farms, has described in his essay the results he has obtained by a statistical study of the milk records of 2,665 cows. The object of his research was to find a single definite numerical value which should express the inherent milking capacity of a cow. To this problem Mr. Gavin has applied modern methods of statistical inquiry, and has arrived at a figure which he calls the revised maximum, and defines as the maximum daily yield maintained or exceeded for not less than three weeks. He shows that this figure gives a reliable measure of the total yield of the cow during her lactation period, and gives a table for correcting it for variations due to age, time of year, &c. Finally he shows how it may be used in examining the inheritance of milk-yielding capacity.

Mr. Gavin's is an excellent piece of work, and is likely to be of real value in following the inheritance of milking capacity. It embodies an original idea well worked out, and the methods and conclusions are both quite sound.

Mr. Hammond's essay describes a long and patient piece of work, in the course of which he examined the contents of the crops of 239 starlings, 171 larks, and smaller numbers of other birds suspected of doing injury to the farmer. His work appears to have been accurate and systematic. His conclusions are drawn logically and clearly, and give evidence that he knows the literature of the subject. The work, however, is of a more

or less routine character, and does not show any definitely original features.

Mr. Robinson's survey of the soils and agriculture of Shropshire is embodied in a pamphlet of over 100 pages, illustrated by sixteen maps. It includes mechanical and chemical analyses of seventy soils and subsoils, representing all the important geological formations in the county. The work seems to have been done with care and discrimination, and the descriptions of the history, agriculture, stock, geology and soils of the different districts of the county are well written, and show that the writer has made a careful study of the subject. It will be of great use to any one who is concerned with local experimental work, for which it will form a sound scientific basis. Mr. Robinson has evidently based his method of working on Messrs. Hall and Russell's survey of the South-Eastern Counties, and cannot lay claim to any definite originality.

Mr. Shildrick's essay is an interesting account of the observations he made on the soils and agriculture of the Kharjeh Oasis. It is quite promising, but obviously unfinished. His observations would, no doubt, have been extended if time had permitted.

Mr. Stokes describes a series of field experiments carried out during the last seven years with the object of investigating the infertility of the soil in the Cars of Nottinghamshire. It is a careful piece of work, but up to the present does not appear to have yielded any very definite conclusions.

We had some difficulty in appraising the relative value of the essays of the first three candidates, Messrs. Gavin, Hammond, and Robinson. Our final conclusion is that all three are about equally good as records of accurate work, but that Mr. Gavin's essay has more claims to originality, and we therefore recommend that the medal be awarded to him. The Society are to be congratulated on the excellent competition that has marked their offer of a medal, even in the first year. When the scheme is better known, increased competition may be anticipated.

(Signed) W. SOMERVILLE.
T. B. WOOD.

December 3, 1912.

THE INTERPRETATION OF MILK RECORDS. By
WILLIAM GAVIN, B.A. (Trinity College, Cambridge).
Lord Rayleigh's Dairy Farms, Terling, Essex.

THE practice of keeping milk records seems at last to be gaining ground throughout the country, and in a few years' time a very considerable amount of material will have accumulated for the study of the dairy cow. The present

writer, working on the records kept for the last twenty-four years on Lord Rayleigh's dairy farms, has endeavoured to deal with the preliminary questions that will arise in the interpretation of these records.

The first difficulty in endeavouring to trace the inheritance of milk yield in cows is to assign a definite numerical value to their inherent milking capability.

Breeders generally rely on such figures as total yield per calf, total yield per calendar year, average per week, &c., but the enormous fluctuations found in the same animal show these to be subject to a variety of outside influences. To make them of value it is necessary to enumerate in every instance the particular circumstances in which the cow in question has been placed during the period taken.

In any statistical study of the inheritance of milk yield, or indeed in any systematised breeding where more than a few cows are dealt with, such a procedure is of course impossible, and it becomes necessary to define a cow's milking capability as accurately as possible by a single and unqualified figure. By milking capability is meant of course the cow's individual somatic power of giving milk. No reference is intended to her genetic qualifications in this respect.

The chief of these exterior circumstances that affect the milk yield seem to be:—

1. Age of cow.
2. No. of weeks in milk.
3. " " " rest before calving (*i.e.*, since the end of the previous lactation period).
4. Interval between calving and subsequent service.
5. Time of year of calving.
6. Food, weather, and general treatment.

It is therefore necessary:—

- (a) To select a figure affected by the minimum number of these influences, and
- (b) To estimate as accurately as is possible the effect of those influences under which it does fall.

(a) *Selection of a figure.*

After a preliminary examination of the material it was decided to see whether either of the two following figures would give a satisfactory basis of comparison, namely:—

1. Average yield per day from the fifth to twelfth week after calving.
2. Maximum yield on any one day.

It was subsequently thought that a single maximum, that is, the highest daily yield that appeared once during a cow's

lactation, was perhaps unduly liable to error, as such variations as those caused by late milking, early milking the previous afternoon, extra food, and clerical mistakes, would have full weight. The work was therefore repeated and a third figure considered, namely :—

3. Maximum daily yield maintained or exceeded for not less than three entries in record book.¹

For the sake of brevity these three figures are called hereafter—(1) Average, (2) Maximum, and (3) Revised Maximum, or R.M.

Now taking the disturbing factors in detail, these measures will all presumably be fully influenced by (1) the age of cow ; but (2) the number of weeks in milk will have no effect ; and they should also be outside the influence of (4) interval between calving and subsequent service.

This leaves factors (1) age, (2) length of “rest” before calving, and (5) season of year of calving to be considered. Food, weather, and general treatment have not been statistically dealt with.

By using any of these figures, then, for describing a cow's capabilities, we at once eliminate two of the most powerful exterior causes of variation, and if this idea be pursued further it seems probable that the most accurate indication of this character of giving milk must be rendered by that function of the yield which shows the least variability.

The variabilities of the three suggested figures have therefore been calculated and compared with one another and with the variability of lactation totals, the latter having been chosen as being the most reasonable of the ordinary standards of measurement. Comparisons have been made by means of the “coefficient of variability” (v)² which is simply

$$\frac{100 \times \text{standard deviation}}{\text{mean}} \left(\frac{100 \sigma}{M} \right), \text{ where } \sigma = \sqrt{\frac{\sum D^2 f}{n}}$$

i.e. the square root of the sum of the products of each frequency and its squared deviation from the mean, divided by the total number of variates. There is thus obtained a series of abstract expressions of variability comparable with one another and dependent neither on measurements adopted, as is the standard

¹ In the records on which this work is based the yield of cows is recorded weekly, but where it is the practice to record daily, the R.M. would be taken from three daily entries.

The three highest daily yields (whether entered weekly or daily) are first noted. Four cows, for example, might give 16, 16, 16—16, 17, 17—16, 18, 16—16, 17, 18 quarts. The R.M. is then taken as the highest yield common to the three entries. Thus, in all the four cases quoted it would be 16 quarts.

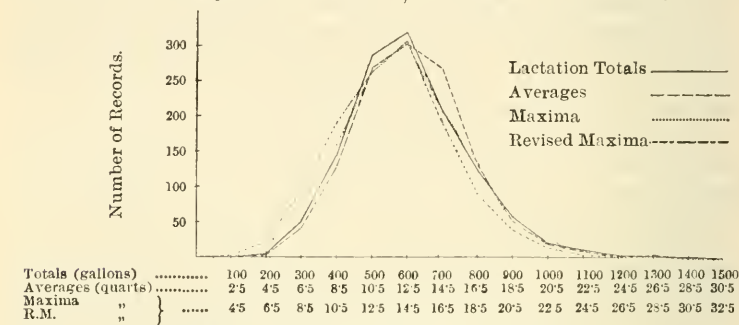
² Karl Pearson : “Regression, Heredity and Panmixia,” *Phil. Trans. Roy. Soc.*, clxxxvii., 1896, page 276.

deviation,¹ nor on system of grouping, as is the modal coefficient² (percentage of total variates as to the mode).

Take first the case of normal lactation periods. Of 2,665 records examined for this point 1,233 were found to have been those of cows in milk from thirty-five to forty-five weeks, and successfully put to the bull not later than the sixteenth week after calving.

The lactation totals, averages fifth to twelfth week, maxima, and "revised maxima" of these 1,233 "normal cows" gave the four following frequency curves:—

FIG. 1.—FREQUENCY CURVES: 1,233 NORMAL LACTATIONS.



Constants of variation—1,233 normal lactations

| | Mean | | Median | | Mode | Modal coefficient |
|--------------------------|--------|--------|--------|--------|--------|-------------------|
| | | | | | | Per cent. |
| Totals | 656.41 | ± 3.24 | 640.53 | ± 4.05 | 608.77 | 26 |
| Averages | 12.82 | ± 0.06 | 12.55 | ± 0.07 | 12.01 | 25 |
| Revised Maxima | 13.87 | ± 0.07 | 13.72 | ± 0.08 | 13.42 | 26 |
| Maxima | 14.40 | ± 0.07 | 14.11 | ± 0.08 | 13.53 | 24 |

| | Standard deviation σ | | Skewness | | Coefficient of variation (v) | |
|--------------------------|--------------------------------|--------|----------|---------|----------------------------------|---------|
| Totals | 168.81 | ± 2.29 | + .282 | ± 0.021 | 25.72 | ± 0.372 |
| Averages | 3.31 | ± 0.04 | + .245 | ± 0.022 | 25.78 | ± 0.373 |
| Revised Maxima | 3.43 | ± 0.05 | + .131 | ± 0.023 | 24.77 | ± 0.357 |
| Maxima | 3.55 | ± 0.05 | + .245 | ± 0.022 | 24.68 | ± 0.355 |

Totals in gallons; remainder in quarts.

¹ Karl Pearson: "On the dissection of asymmetrical frequency curves," *Phil. Trans. Roy. Soc.*, clxxxv., 1894, page 71.

² E. Davenport: *Principles of Breeding*, page 422.

Details of Method.—A class unit of 100 gallons was taken for totals. In all other cases the unit was two quarts.

The mode was calculated from the formula—

$$\text{Mode} = \text{mean} - 3(\text{mean} - \text{median}),$$

which gives a reasonably close value in most cases.^{1 2}

The modal coefficient is the percentage of variates falling on the empirical mode. It thus gives a measure of conformity

to type. Skewness is $\frac{\text{mean} - \text{mode}^3}{\sigma}$.

The probable errors of the various constants have been calculated from the following formulæ:—

$$\text{P.E.}_{\text{mean}} = \pm 0.6745 \frac{\sigma}{\sqrt{n}}$$

$$\text{P.E.}_{\text{median}} = \pm 0.84535 \frac{\sigma}{\sqrt{n}} \quad (4)$$

$$= \pm 1.25332 \times \text{P.E.}_{\text{mean}}. \quad (5)$$

$$\text{P.E.}_{\sigma} = \pm 0.6745 \frac{\sigma}{\sqrt{2n}} \quad (6)$$

$$\text{P.E.}_{\text{skewness}} = \pm 0.6745 \sqrt{\frac{3}{2n}} \frac{1}{\sqrt{\{1 + 3(sk)^2\}}} \quad (7)$$

$$\text{P.E.}_v = \pm \frac{0.6745 v}{\sqrt{2n}} \left[1 + 2 \left(\frac{v}{100} \right)^2 \right]^{\frac{1}{2}}$$

These formulæ are only strictly correct in cases of normal distribution.

From the table of constants it is seen that the mean of the revised maximum is about one quart above the mean of the averages, while the mean maximum is about one pint higher still.

Both median and mode are less than the mean in every case, showing the curves to have positive skewness. It is least

¹ K. Pearson : *Biometrika*, Vol. I., page 260. 1902.

² C. V. L. Charlier : *Meddelanden fran Lunds Astronomiska Observatorium*, Series II., No. 4 Kongl. *Fysiografiska Sällskapetets Handlingar*, Bd. 16, pp. 1-51. Lund, 1906.

³ K. Pearson : "Skew Variation in Homogeneous Material," *Phil. Trans. Roy. Soc.*, clxxxvi., 1895, page 370.

⁴ W. F. Sheppard : *Phil. Trans. Roy. Soc.*, clxlii., 1898, page 101.

⁵ Raymond Pearl : "Biometric Study of Egg Production," *U.S. Bureau Animal Industry*, Bull. 110, page 23.

⁶ Raymond Pearl : *Biometrika*. Vol. VI., pp. 112-117, 1908. This author shows that this formula can only be used when curves approximate to the normal.

⁷ L. N. G. Filon and K. Pearson : *Phil. Trans. Roy. Soc.*, clxli., 1898, page 229.

in the revised maximum, but this is not necessarily a point in the latter's favour. The variation in skewness of physiological characters is generally considerable, and at present seems more or less mysterious.

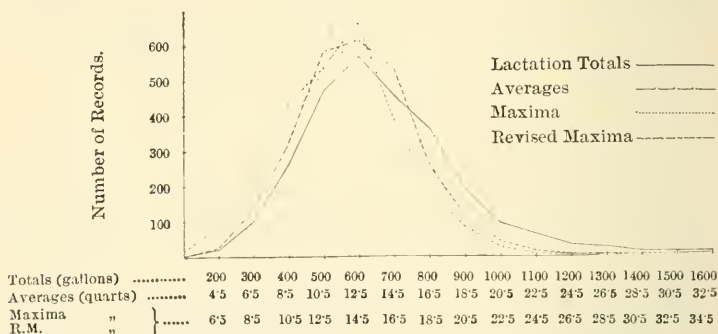
The value of the modal coefficient for totals shows that about 25 per cent., or 1 in 4, of individuals conformed to the dominant yield-type.

When we come to compare the coefficients of variability and the curves themselves, it is seen that, *for normal lactation periods*, all the above figures, namely lactation totals, averages fifth to twelfth week, revised maxima, and maxima show almost identical variation, and may be taken to be of equal value as indications of the capabilities of a cow.

But a figure is required that shall hold good for abnormal lactations also.

In the following calculations *all* the 2,665 records previously examined were included, *i.e.*, normal and abnormal, and frequency curves plotted as before.

FIG. 2.—FREQUENCY CURVES : 2,665 LACTATIONS, NORMAL AND ABNORMAL.



Constants of variation, 2,665 lactations, normal and abnormal.

| | Mean. | | Median. | | Mode. | Modal coefficient |
|------------------|--------|--------|---------|--------|--------|-------------------|
| Totals . . . | 714.35 | ± 2.94 | 683.80 | ± 3.68 | 623.80 | Per cent. 17 |
| Averages . . . | 12.48 | ± 0.04 | 12.25 | ± 0.05 | 11.79 | 23 |
| Revised Maxima . | 13.50 | ± 0.05 | 13.49 | ± 0.06 | 13.47 | 24 |
| Maxima . . . | 14.07 | ± 0.05 | 13.94 | ± 0.06 | 13.68 | 23 |

Constants of variation, 2,665 lactations, normal and abnormal.

| | Standard of deviation. | Skewness. | Coefficient of variation. |
|------------------|------------------------|--------------------|---------------------------|
| Totals . . . | 226.41 \pm 2.08 | + .400 \pm 0.013 | 31.69 \pm 0.321 |
| Averages . . . | 3.44 \pm 0.03 | + .201 \pm 0.015 | 27.56 \pm 0.273 |
| Revised Maxima . | 3.57 \pm 0.03 | + .008 \pm 0.016 | 26.44 \pm 0.254 |
| Maxima . . . | 3.67 \pm 0.03 | + .106 \pm 0.016 | 26.08 \pm 0.250 |

Totals in gallons; remainder in quarts.

[Compiled from every complete available record (free from illness) of "Whitelands," "Taylors," and "Hatfield Wick" herds from 1888-1910.]

On comparing these constants with those obtained from "normal" lactations only, it is found, as might have been expected, that a very great increase in the variability of the totals has occurred. The modal coefficient shows that only about one in six cows now conform to the dominant yield-type, when judged by this method. Both standard deviation and skewness have increased, and the coefficient of variability has risen from 25.72 to 31.69, an advance of 5.97, or 23 per cent. of its previous value.

According to these data, the least variable function of a cow's milk-production is the maximum day yield, which gives a coefficient of 26.08, falling to 24.68 when restricted to normal lactations.

It is of some interest to compare this figure with those obtained for other physiological characters. A few connected with the primary sexual organs are given in the following table.¹

| Subject | Character | Coefficient of variation | Skewness |
|----------------------|------------------------------------|--------------------------|----------|
| Nelumbium luteum . | Number of seeds ² . . | 17.445 | +0.0164 |
| Poland-China Swine . | Size of litter ³ . . | 27.411 | + .0701 |
| Duroc-Jersey Swine . | do. ³ . . | 25.997 | + .0539 |
| Horse | Fecundity ⁴ | 24.771 | - .1286 |
| Man | Number of children ⁵ . | 48.41 | + .0802 |
| Domestic fowl . . | Annual egg production ¹ | 34.21 | - .205 |
| Cow | Milk yield ⁶ | 26.08 | + .106 |

¹ From Raymond Pearl. *Study of Egg Production*. U.S. Bureau Animal Industry. Bull. 110.

² Raymond Pearl. *American Naturalist*. XL. page 756. 1906.

³ Rommel. U.S. Bureau Animal Industry. Circular No. 95.

⁴ K. Pearson. *Biometrika*. Vol. I. page 289. 1902.

⁵ Powys. do. Vol. V. page 251. 1905.

⁶ When measured by maximum day yield. Present paper.

Raymond Pearl says,¹ "It appears to be generally the case that fecundity, fertility, and closely allied characters are highly variable. There would seem to be a tendency for the coefficients measuring variation in these characters to be above a value of 20."

The amount of variation in milk yield of cows is therefore in no way exceptional. According to the present data, it is about equal to that found in swine with regard to the size of litter and not much more than half that of man in respect to size of family.

It was next required to find whether the average, maximum, and revised maximum really were closely connected with the total lactation yield which the owner might expect to obtain from his cow under ordinary conditions. The similarity of the variation curves does not, of course, of itself prove any connection.

The correlation between totals and the three suggested systems was therefore determined for the 1,233 normal lactations, with the following results :

| CORRELATION — 1,233 "NORMAL LACTATIONS." | | |
|--|--|--------------------------------|
| Between | Correlation ¹ Coefficient (<i>r</i>) | Probable Error ² |
| "Averages" and totals | +·858 | ±·005 |
| "Revised Maxima" and totals | +·844 | ±·005 |
| Maxima and totals | +·839 | ±·006 |

Since the limiting restrictions of these so-called normal lactations are by no means narrow (i.e. they include cows whose lactations vary from thirty-five to forty-five weeks inclusive, that were served any time up to sixteenth week after calving, and that calved at all times of the year) these coefficients of correlation seem very satisfactory, and high enough to justify the use of any of the above figures as determinants of a "normal" cow's yield.

¹ From Raymond Pearl. *Study of Egg Production*. U.S. Bureau Animal Industry. Bull. 110.

$$^1 \quad r = \frac{\sum D_x D_y}{n \sigma_x \sigma_y} \quad .$$

$$^2 \quad P.E_r = \pm \frac{0.6745 (1 - r^2)}{\sqrt{n}}$$

CORRELATION. AVERAGES AND TOTALS.

1,233 NORMAL LACTATIONS.

| Quarts | Gallons | 200—300 | 300—400 | 400—500 | 500—600 | 600—700 | 700—800 | 800—900 | 900—1000 | 1000—1100 | 1100—1200 | 1200—1300 | 1300—1400 | 1400—1500 | Totals |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|--------|
| 3·5—5·5 | 2 | 2 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 4 |
| 5·5—7·5 | 2 | 24 | 12 | 2 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 41 |
| 7·5—9·5 | ... | 23 | 64 | 33 | 9 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 129 |
| 9·5—11·5 | ... | ... | 58 | 147 | 54 | 9 | ... | ... | ... | ... | ... | ... | ... | ... | 268 |
| 11·5—13·5 | ... | ... | 8 | 85 | 136 | 62 | 12 | ... | ... | ... | ... | ... | ... | ... | 303 |
| 13·5—15·5 | ... | ... | 2 | 17 | 101 | 93 | 44 | 12 | ... | ... | ... | ... | ... | ... | 269 |
| 15·5—17·5 | ... | ... | ... | 3 | 17 | 37 | 52 | 19 | 2 | 1 | ... | ... | ... | ... | 131 |
| 17·5—19·5 | ... | ... | ... | ... | 1 | 6 | 18 | 19 | 5 | 2 | ... | ... | ... | ... | 51 |
| 19·5—21·5 | ... | ... | ... | ... | ... | ... | 2 | 7 | 6 | 3 | 1 | ... | ... | ... | 19 |
| 21·5—23·5 | ... | ... | ... | ... | ... | ... | ... | ... | 5 | 4 | ... | ... | ... | ... | 9 |
| 23·5—25·5 | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 | 1 | 1 | ... | ... | 4 |
| 25·5—27·5 | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | ... | ... | 1 | 1 | 3 |
| 27·5—29·5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | 1 | 2 |
| TOTALS | 4 | 49 | 144 | 287 | 319 | 207 | 128 | 57 | 20 | 11 | 3 | 2 | 2 | 2 | 1233 |

$$r = + \cdot 858.$$

CORRELATION. REVISED MAXIMA AND TOTALS.

1,233 NORMAL LACTATIONS.

| Quarts | Gallons | 200—300 | 300—400 | 400—500 | 500—600 | 600—700 | 700—800 | 800—900 | 900—1000 | 1000—1100 | 1100—1200 | 1200—1300 | 1300—1400 | 1400—1500 | Totals |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|--------|
| 3·5—5·5 | ... | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 |
| 5·5—7·5 | 3 | 12 | 6 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 21 |
| 7·5—9·5 | 1 | 29 | 48 | 12 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 91 |
| 9·5—11·5 | ... | 7 | 57 | 103 | 22 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 189 |
| 11·5—13·5 | ... | ... | 28 | 107 | 101 | 23 | 3 | ... | ... | ... | ... | ... | ... | ... | 262 |
| 13·5—15·5 | ... | ... | 5 | 57 | 135 | 101 | 27 | 1 | ... | ... | ... | ... | ... | ... | 326 |
| 15·5—17·5 | ... | ... | ... | 7 | 49 | 62 | 55 | 16 | 1 | ... | ... | ... | ... | ... | 190 |
| 17·5—19·5 | ... | ... | ... | 1 | 10 | 18 | 31 | 23 | 5 | 1 | ... | ... | ... | ... | 89 |
| 19·5—21·5 | ... | ... | ... | ... | 1 | 3 | 11 | 14 | 4 | 4 | 1 | ... | ... | ... | 38 |
| 21·5—23·5 | ... | ... | ... | ... | ... | ... | 1 | 3 | 8 | 2 | ... | ... | ... | ... | 14 |
| 23·5—25·5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 3 | 1 | ... | ... | ... | 4 |
| 25·5—27·5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | 1 | 1 | 3 |
| 27·5—29·5 | ... | ... | ... | ... | ... | ... | ... | ... | 2 | ... | 1 | 1 | 1 | 1 | 5 |
| TOTALS | 4 | 49 | 144 | 287 | 319 | 207 | 128 | 57 | 20 | 11 | 3 | 2 | 2 | 2 | 1233 |

$$r = + \cdot 841.$$

CORRELATION. MAXIMA AND TOTALS.

1,233 NORMAL LACTATIONS.

| Quarts | Gallons | 200—300 | 300—400 | 400—500 | 500—600 | 600—700 | 700—800 | 800—900 | 900—1000 | 1000—1100 | 1100—1200 | 1200—1300 | 1300—1400 | 1400—1500 | Totals |
|-----------|---------|---------|---------|---------|---------|---------|---------|---------|----------|-----------|-----------|-----------|-----------|-----------|--------|
| 5·5—7·5 | 2 | 7 | 4 | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | 13 |
| 7·5—9·5 | 2 | 30 | 33 | 8 | 1 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 74 |
| 9·5—11·5 | ... | 12 | 64 | 71 | 12 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 159 |
| 11·5—13·5 | ... | ... | 34 | 126 | 87 | 15 | 1 | ... | ... | ... | ... | ... | ... | ... | 263 |
| 13·5—15·5 | ... | ... | 7 | 63 | 132 | 80 | 19 | 1 | ... | ... | ... | ... | ... | ... | 302 |
| 15·5—17·5 | ... | ... | 2 | 17 | 69 | 68 | 42 | 8 | ... | ... | ... | ... | ... | ... | 206 |
| 17·5—19·5 | ... | ... | ... | 2 | 15 | 37 | 50 | 26 | 2 | 1 | ... | ... | ... | ... | 133 |
| 19·5—21·5 | ... | ... | ... | ... | 3 | 6 | 8 | 15 | 7 | 3 | ... | ... | ... | ... | 42 |
| 21·5—23·5 | ... | ... | ... | ... | ... | 1 | 7 | 7 | 7 | 3 | 1 | ... | ... | ... | 26 |
| 23·5—25·5 | ... | ... | ... | ... | ... | ... | 1 | ... | 2 | 3 | ... | ... | ... | ... | 6 |
| 25·5—27·5 | ... | ... | ... | ... | ... | ... | ... | ... | ... | 1 | 1 | ... | ... | ... | 2 |
| 27·5—29·5 | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | 1 | 2 | 1 | ... | 5 |
| 29·5—31·5 | ... | ... | ... | ... | ... | ... | ... | ... | 1 | ... | ... | ... | 1 | ... | 2 |
| TOTALS | 4 | 49 | 144 | 287 | 319 | 207 | 128 | 57 | 20 | 11 | 3 | 2 | 2 | 1233 | |

$$r = + \cdot 839.$$

The regression coefficients obtained from the correlation tables are as follows :

| | | |
|---|---------------------|---------------------|
| Regression of totals relative to averages | 43·229 ¹ | $\pm 0\cdot 5457^2$ |
| „ averages „ totals | ·017 | $\pm \cdot 0002$ |
| Regression of totals relative to revised max. | 41·542 | $\pm \cdot 5179$ |
| „ revised max. „ totals | ·017 | $\pm \cdot 0002$ |
| Regression of totals relative to maxima | 39·852 | $\pm \cdot 4968$ |
| „ maxima „ totals | ·017 | $\pm \cdot 0002$ |

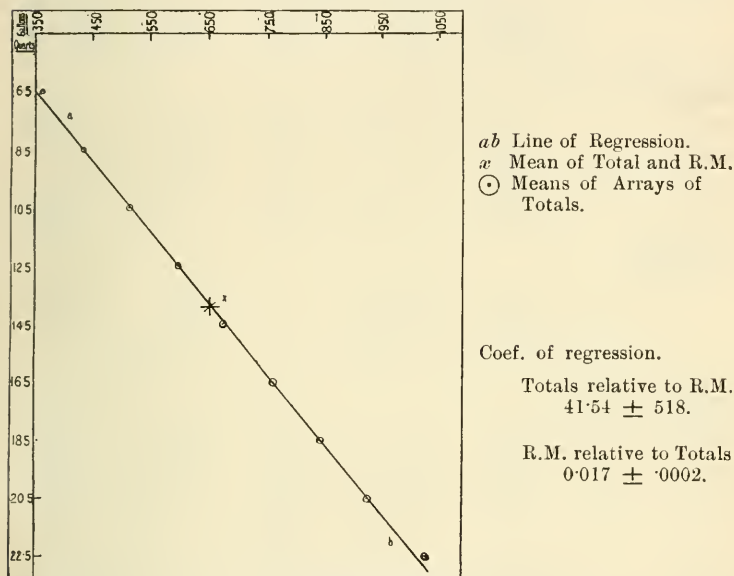
¹ Regression coefficient of x relative to $y = r \frac{\sigma_x}{\sigma_y}$.

² P.E. regression coefficient = $\frac{0\cdot 6745 \sigma_x}{\sigma_y} \sqrt{\frac{1-r^2}{n}}$

Now if the regression is linear, *i.e.*, if the means of arrays fall on the line representing characteristic regression, we shall be justified in using those coefficients for estimating totals from any of the other three figures.

The following diagram taken from the correlation table already given of totals and revised maxima for 1,233 normal cows represents perhaps the most satisfactory of any of the results obtained. It shows clearly that the regression is very nearly linear.

FIG. 3.—REGRESSION OF TOTALS RELATIVE TO REVISED MAXIMA.
1,233 NORMAL LACTATIONS.



With regard to its practical application, take for example the case of a cow giving a revised maximum of ten quarts.

Since the mean revised maximum is 14 quarts, she differs from that mean by -4 quarts. Her total will therefore differ from the mean of totals, which is 656 gallons, by $-(4 \times 41.5)$ gallons; *i.e.*, her probable normal yield will be $656 - 166$ gallons = say 500 gallons. Further, the chances are *even* that this estimate of 500 gallons is correct within the limits of ± 60 gallons.¹

¹ P.E. of estimate = $0.6745 \times \sigma \sqrt{1-r^2}$. The factor 0.6745 is not strictly legitimate where distribution is not normal.

Lactation periods other than "normal" were dealt with in a similar manner and gave results summarised in the following table :—

| | "ABNORMAL" (SHORT) | "NORMAL" LACTATIONS. | | | "ABNORMAL" (LONG) |
|---------------------|-----------------------|----------------------|--------|--------|----------------------|
| Weeks in Milk | 30—34 | 35—45 | 40—45 | 41—45 | 55—60 |
| No. of Cows | 167 | 1233 | 696 | 590 | 172 |
| <i>Totals</i> | | | | | |
| M . . | 519·4 | 656·4 | 693·5 | 700·68 | 817·44 |
| σ . . | 137·42 | 168·81 | 175·32 | 178·38 | 218·73 |
| V . . | 26·45 | 25·72 | 25·28 | 25·46 | 26·76 |
| <i>Averages</i> | | | | | |
| M . . | 12·34 | 12·82 | 12·90 | 12·97 | 13·00 |
| σ . . | 3·21 | 3·31 | 3·44 | 3·52 | 3·71 |
| V . . | 25·98 | 25·78 | 26·77 | 27·13 | 28·54 |
| r . . | +·885 | +·858 | +·879 | +·878 | +·873 |
| <i>Revised Max.</i> | | | | | |
| M . . | 13·61 | 13·87 | — | 13·98 | — |
| σ . . | 3·55 | 3·43 | — | 3·65 | — |
| V . . | 26·08 | 24·77 | — | 26·11 | — |
| r . . | +·831 | +·844 | — | +·876 | — |
| <i>Maxima</i> | | | | | |
| M . . | 14·21 | 14·40 | 14·44 | 14·49 | 13·42 |
| σ . . | 3·67 | 3·55 | 3·69 | 3·73 | 3·80 |
| V . . | 25·83 | 24·68 | 25·55 | 25·05 | 28·32 |
| r . . | +·823 | +·839 | +·869 | +·876 | +·832 |

M = Mean. σ = Standard deviation. V = Variation coefficient. r = Correlation with totals.
Totals in gallons. Remainder in quarts.

Several points are brought out by this table :—

(i.) That whatever the length of lactation period, the average, revised maximum and maximum are very little influenced by it, and are all definitely correlated, in all cases, with the total production of the cow.

(ii.) That as we pass from averages to revised maxima to maxima, the variability shows a tendency to decrease; that as a rule the least variation is found in the maxima.

(iii.) That correlation with totals decreases in the same direction. This at first sight appears somewhat contradictory to (ii.), but since totals represent the estimate of yield given by

the whole length of lactation period, their correlation with other estimates of yield based on shorter periods would naturally tend to be in positive ratio to the duration of those periods.

(iv.) That the means even of the maxima seem to increase, in normal cows, with the lactation period. The increase is negligible for practical purposes, but nevertheless it does seem to exist. The point needs further investigation, but without committing oneself, it seems probable that the better cows would tend on the whole to remain longer in milk, and so form an undue proportion of the longer lactation groups. They would often receive better food and attention, and the distance between their maximum yield and zero would be greater. These, however, are merely general suggestions. It is of course possible that the connection is a physiological one.

How little the maximum is influenced by the number of weeks in milk is shown in the following diagram, where total and maximum frequencies are plotted for both short (30—34 weeks) and long (55—60 weeks) lactations.

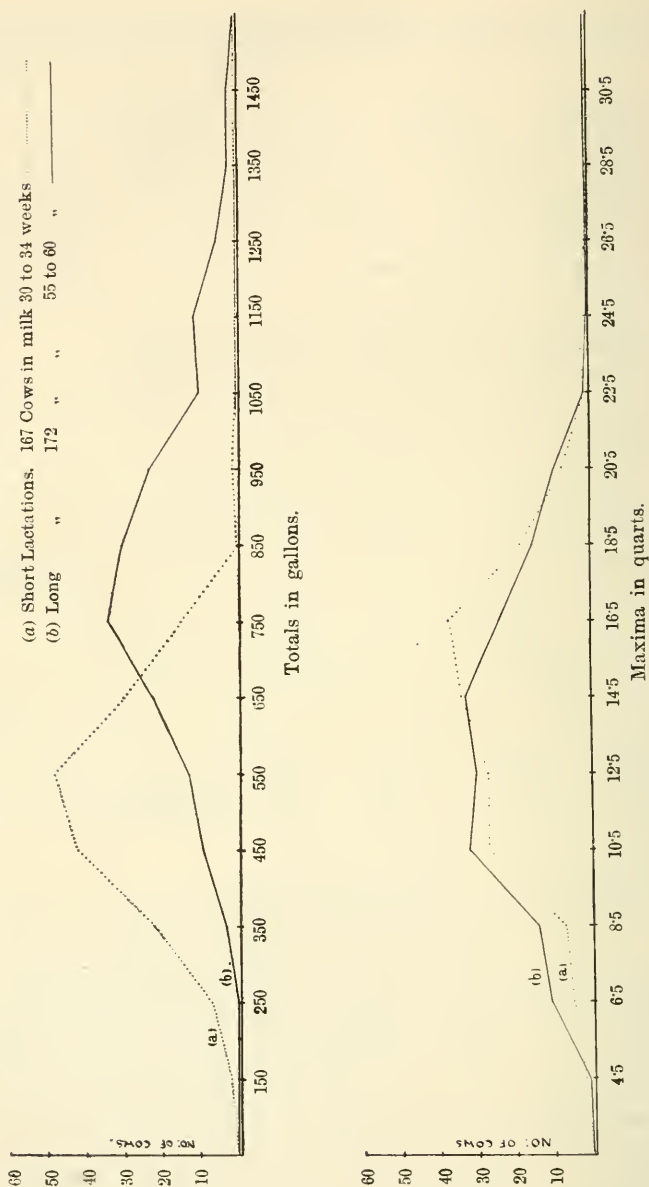
The mean maximum of the long lactation group is in this case less than that of the 30—34 weeks group. This does not fall into line with the results just stated that were found within the range of normal lactations. It would seem that the suggestion there put forward does not hold good for cows remaining in milk for more than about a year, but the present data are insufficient on this point to justify definite conclusions.

In considering the foregoing results, it became a matter of some difficulty to decide between the "average" and the "maximum" for general use. On the one hand the maximum showed the less variation, while on the other the average gave better correlation with totals. But more important than totals is the physiological capacity of the mammary gland, and the point really at issue is, which of these two figures indicates this with the less exposure to error.

When the possible sources of error come to be considered, they may be classed into two groups :—

1. Firstly, those influences which are general in character and tend to act in the same direction for considerable periods, such as temperature, time of year, food, method of feeding, rainfall, housing, &c. These, it is suggested, would have more influence on averages than maxima. If they are generally unfavourable during the two months, the average will be reduced. But there seems a very good chance that on *one* day during all this time the cow will have everything in her favour (rise in temperature, new pasture, little extra cake, &c.), *i.e.*, that in spite of generally adverse conditions, there would occur one day on which the environment would approach the ideal, and would enable the cow to show "what she was worth." If

FIG. 4.—FREQUENCIES—TOTALS AND MAXIMA.



on the other hand these influences are generally favourable it will merely mean that this ideal environment occurs more frequently. The maximum will be as before, but the average will be increased. One cannot help feeling that this is, in the main, the explanation of the fact that in the present investigation the variation coefficient of the "maximum" has in every case come out lower than that of the "average."

2. The second class of error is that to which any *one* weighing, whether daily or weekly, is exposed, such as late milking, early milking previous afternoon, extra food, wind, clerical mistakes, &c.; in short, all the usual disadvantages of a single sampling. These would have full effect on the maximum, but might be considered negligible on an eight-weeks' average.

It was when faced with these two methods, each with its concomitant error, that the writer endeavoured to avoid both by the use of the *revised maximum*, the variation constants of which have been inserted in most of the foregoing tables.¹

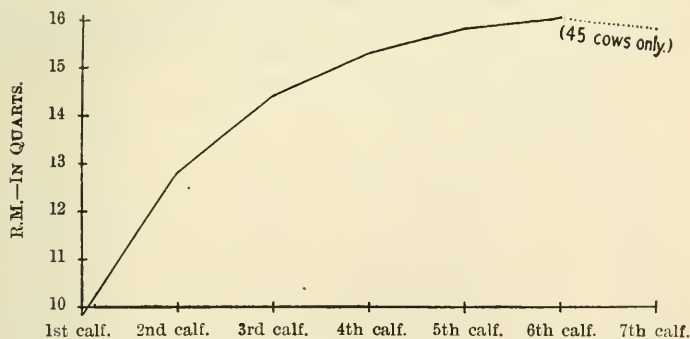
Whether this use is justified remains for further work and maturer opinion to decide. At the present time, in the absence of both, it is being used for attacking the more practical problems of selection and breeding.

(b). *Circumstances affecting the Revised Maximum.*

With regard to this section of the subject, the number of records so far extracted is perhaps not large enough to justify any exact figures, but the results so far obtained will be given, with the proviso that slight modifications may be found necessary with further work.

Influence of Age.—The following diagram gives the mean revised maxima of 110 cows with their first six calves.

FIG. 5.—MEAN R.M. WITH SUCCESSIVE CALVES GIVEN BY 110 COWS.

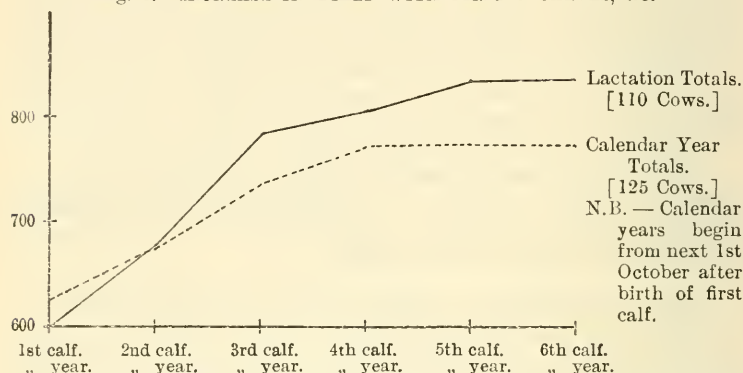


¹ The revised maximum has further the very great practical advantage over the average that it requires no calculation.

| | | | | | | | | | | |
|----------|-----|------|------|--------|------------|----------|------|------|------|----------|
| 1st calf | ... | Mean | 9.8 | quarts | } 110 Cows | 7th calf | Mean | 15.8 | qts. | 45 cows. |
| 2nd " | ... | " | 12.8 | " | | 8th " | " | 15.8 | " | 28 " |
| 3rd " | ... | " | 14.4 | " | | | | | | |
| 4th " | ... | " | 15.3 | " | | | | | | |
| 5th " | ... | " | 15.8 | " | | | | | | |
| 6th " | ... | " | 16.0 | " | | | | | | |

The following diagram, obtained in the preliminary investigation, should perhaps also be given. It gives the increase in lactation totals with age for the same 110 cows, also the increase in calendar year totals for another 125 cows. (A few cows appear in both curves.)

Fig. 6.—INCREASE IN YIELD WITH FIRST 6 CALVES, &C.



The most regular curve is given by the R.M., the mode of which does not appear to be reached until the sixth calf. The increase is very slight however after the fourth calf, and for a standard figure representing the *mature* inherent capability of a cow the average of the fourth, fifth and sixth R.M. has been taken. It has been termed the standard R.M. or R.M._s. The mode of the curve has not been chosen because comparatively few cows are kept after the sixth calf, and it was thought such a figure would give a misleadingly large indication of the yield the owner might expect to get in practice.

Constants given by the R. M. curve are as follows :—

| Calves | M. (quarts). | σ | V. |
|--|-----------------|----------------|-----------------|
| R.M. ₁ | 9.8 \pm 0.13 | 2.0 \pm 0.09 | 20.5 \pm 0.96 |
| R.M. ₂ | 12.8 \pm 0.13 | 2.1 \pm 0.09 | 16.6 \pm 0.77 |
| R.M. ₃ | 14.4 \pm 0.16 | 2.5 \pm 0.11 | 17.7 \pm 0.82 |
| R.M. ₄ | 15.3 \pm 0.16 | 2.5 \pm 0.11 | 16.6 \pm 0.77 |
| R.M. ₅ | 15.8 \pm 0.17 | 2.7 \pm 0.12 | 17.6 \pm 0.82 |
| R.M. ₆ | 16.0 \pm 0.18 | 2.8 \pm 0.13 | 18.0 \pm 0.84 |
| R.M. _s i.e. average R.M. 4-6 | 15.6 \pm 0.17 | 2.6 \pm 0.12 | 16.4 \pm 0.76 |

The most important calculation will be to estimate the standard R. M. from first calf R. M. The large variation coefficient of the latter shows this to be considerably less accurate than estimation from second calf R. M., but the great saving in time effected by judging the cow after the first calf would probably financially compensate for this loss of accuracy. More extensive data are being employed for the calculation of correlation and regression coefficients between R.M.₁, R.M.₂, R.M.₃, and R.M.₄, and the present number of cows does not justify the use of an exact factor; but it will be seen that the following rough corrections bring the means within a quart of the standard R.M. :—

| | | |
|------------------------|----------------|---------|
| Mean R.M. ₁ | + 50 per cent. | = 14.7. |
| " R.M. ₂ | + 20 per cent. | = 15.4. |
| " R.M. ₃ | + 10 per cent. | = 15.8. |
| " R.M. ₄ | | = 15.6. |

Now if suitable corrections are made for exterior circumstances affecting the R.M., the variation found in the latter from year to year with the same cow should be diminished. Frequency curves have therefore been plotted of the "range" of R.M. for the 110 cows for six years. For example, an individual cow giving successive R.M., 8—10—10—12—14—13 is entered as having a range of 6 quarts. When above corrections for age are made, her R.M. become 12—12—11—12—14—13, and her range is 3 quarts.

The frequencies of the range of variation found in each of these 110 individual cows during the first six years of their milking career yielded the following constants :—

| | | |
|-----------------------------|------|---------|
| Mean of individual "ranges" | 7.61 | quarts. |
| Median | " | 7.40 " |
| Mode | " | 6.98 " |

After correction for age by the addition of 50 per cent. to first calf R.M.₁, 20 per cent. to R.M.₂, and 10 per cent. to R.M.₃, these were reduced as follows :—

| | | |
|---|------|---------|
| Mean of individual "ranges" corrected for age | 5.02 | quarts. |
| Median | " | 4.67 " |
| Mode | " | 3.97 " |

Influence of season of year of calving.—For this point the extracted records of two farms were taken, which amounted to 1,418 lactations.

The mean R.M. for cows calving in each month of the year was calculated. These are given, together with the number of records from which they were obtained, in column 1 of the following table. In column 2 is given the deviation of each monthly mean from the mean of the whole; and in column 3

the means obtained by correcting with a convenient number approximating to this deviation. These rough corrections again bring the means of uniformity within about a quart.

| Month of Calving. | 1 | | 2 | 3 | |
|-------------------|------------|----------------|--|-------------|------|
| | Mean R.M. | No. of records | Deviation of monthly mean from mean for year | Correction. | |
| | | | per cent. | per cent. | |
| January . . . | 14·3 | 136 | +2·1 | — | 14·3 |
| February . . . | 14·6 | 175 | +4·2 | —5 | 13·9 |
| March . . . | 14·7 | 104 | +5·0 | —5 | 14·0 |
| April . . . | 15·5 | 73 | +10·7 | —10 | 14·0 |
| May . . . | 15·3 | 87 | +9·3 | —10 | 13·8 |
| June . . . | 13·2 | 139 | —5·7 | +5 | 13·9 |
| July . . . | 12·7 | 153 | —9·3 | +10 | 14·0 |
| August. . . | 11·5 | 112 | —17·9 | +20 | 13·8 |
| September . . | 14·8 | 67 | +5·7 | —5 | 14·1 |
| October . . . | 14·4 | 125 | —2·9 | — | 14·4 |
| November . . | 13·8 | 104 | —1·4 | — | 13·8 |
| December . . | 13·8 | 143 | —1·4 | — | 13·8 |
| | Mean 14·01 | Total 1418 | | | |

It will be seen that the highest R.M. occur in April and May at the natural calving season and at a time when there is an abundance of natural succulent food. Throughout the summer the monthly average falls, reaching its lowest in August, at which time green food has also reached its minimum, and exterior conditions generally are unfavourable. In the autumn succulent food is again obtainable in the form of roots, the weather is less trying, the cows come into the sheds, more artificial and stimulating food is given, and the R.M. show a sudden rise which is more or less maintained throughout the winter months.

It is interesting to compare these figures with the mean lactation totals of cows calving in the different months. Only "normal" lactations could of course be taken, and out of these 1,418 records 731 were found to be available. They gave the following results :—

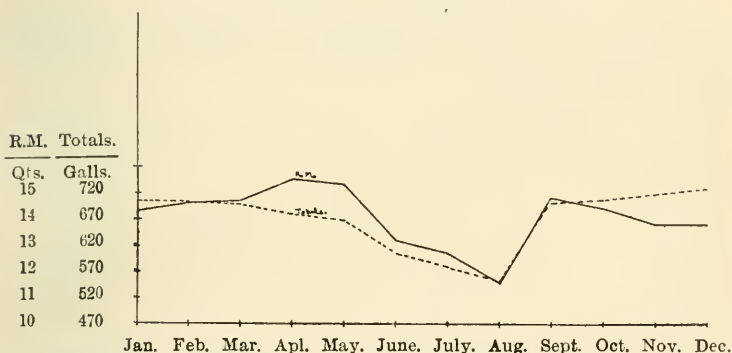
| Month of calving. | Mean lact. total. | Deviation from mean. | No. of records. |
|---------------------|----------------------|-------------------------|-----------------|
| January | 704 | per cent. +5·3 | 80 |
| February | 702 | +4·8 | 109 |
| March | 700 | +4·5 | 57 |
| April | 682 | +1·8 | 37 |
| May | 667 | -0·5 | 49 |
| June | 607 | -9·5 | 80 |
| July | 580 | -13·6 | 79 |
| August. | 551 | -17·8 | 46 |
| September | 700 | +4·6 | 25 |
| October | 705 | +5·1 | 54 |
| November | 715 | +6·8 | 45 |
| December | 728 | +8·6 | 70 |
| | Mean 670 | | Total 731 |

These results are compared in the following diagram :—

FIG. 7.—MEAN R.M. AND LACTATION TOTALS FOR COWS CALVING AT DIFFERENT TIMES OF THE YEAR.

R.M. 1,418 records.

Totals 731 records.



The full corrections necessary to bring the monthly means within a quart of one another were used on the 110 cows in the same way as the corrections for age, but were found to increase the range. Evidently normal variation or possibly other factors are responsible for some of the differences in the monthly means. Various modifications of these corrections were tried however, and the following system was found to reduce the range :—

Cows calving in April and May . Deduct 5 per cent. from R.M.
 " " July . . . Add 5 " to "
 " " August . . . " 10 " " "

With these alterations the frequency curve of range of variation of individual cows gave the following results:—

Mean of range of individual variations, corrected for age and season, 4·80 quarts.

Median " " " " " 4·36 "

Mode " " " " " 3·48 "

The improvement in the mode so far effected is as follows:—

Uncorrected Mode 6·98 quarts

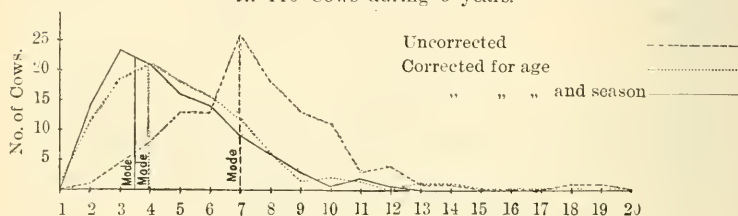
Corrected for age 3·97 "

Corrected for age and season 3·48 "

and is shown in the following figures giving the three frequency curves together.

FIG. 8.—INDIVIDUAL VARIATION (RANGE) IN QUARTS.

In 110 Cows during 6 years.



Influence of period of "rest" before calving. The R.M. of 347 records were divided into groups according to the number of weeks the cows were dry before calving. The means of these groups were as follows:—

| Previous dry period | | | | Mean R.M. | No. of Cows |
|---------------------|---|---|---|-----------|-------------|
| 0—5 weeks | . | . | . | 15·0 | 26·5 |
| 5—10 " | . | . | . | 15·8 | 162·5 |
| 10—15 " | . | . | . | 15·8 | 115·5 |
| 15—20 " | . | . | . | 15·8 | 42·5 |

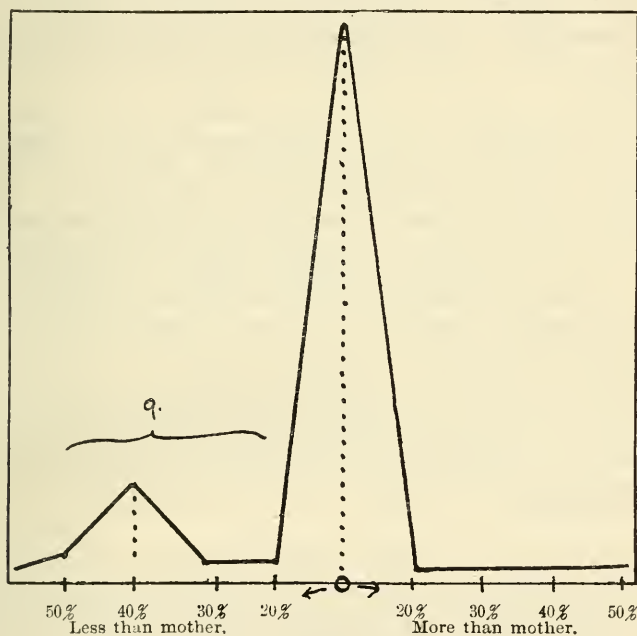
No correction is therefore made to the R.M. on this account. It is by no means intended to imply that the period of rest before calving is of no importance; on the contrary most dairy farmers will agree that it has a very considerable influence on the subsequent performance, and more especially condition of a cow. What is meant is that, in this method of classing a cow by her R.M., variations due to this cause are slight in comparison to the unaccountable irregularities always present.

Note 1. On the practical use of the R.M.—Such a figure is, it is thought, an obvious necessity for determining the

correlation of milk yield with quality, or other characteristics. It should also be of value in dealing with the question of heredity.

It is not intended to discuss here the inheritance of yield, but one example of the use of the R.M. may be given in this connection. The following diagram shows the deviation of forty-eight daughters of one bull from their mothers. Daughters whose R.M. do not differ by more than three quarts from that of their mother are entered on the zero line; wider divergencies are calculated in percentages and entered on the right or left of the zero line according to whether daughters are greater or less than their mothers. This bull from general observation was thought to be a good one, but it is clear from the diagram that it has tended to lower the average yield capability.

FIG. 9.—BULL NO. 9. 1ST CALF R.M. DEVIATIONS F_1 .



Note 2. Prof. James Wilson's figures.—In a paper on the inheritance of milk yield¹ this writer gives a method for estimating lactations totals. He says, "The calculation is to multiply the average daily yield in pounds over two or three weeks at the maximum by about twenty, and the result gives

¹ *Proc. Royal Dublin Society*, June, 1911.

an approximate indication of the yield for the normal lactation in gallons. A lower figure, say eighteen or nineteen, has to be used for cows calving in spring or summer."

The data given in the consideration of influence of season of calving gave the following figures :—

| | Average R.M. | Average Total. | Factor as above. |
|----------------------------|--------------|----------------|------------------|
| Cows calving September—May | 14.4 | 702.3 | 19.5 |
| " " June—August | 12.5 | 583.9 | 18.7 |

This quite confirms Professor Wilson's figures, which he gives approximately as twenty and eighteen or nineteen.

SUMMARY.

(a) It seems necessary both for practical breeding on a large scale and for scientific enquiry on the inheritance of milk yield and allied questions, to be able to describe the milking capability of a cow by a single unqualified figure.

(b) In view of the large number of exterior influences that affect total yields over long periods (which are generally used in milk records) it is advisable to adopt some additional descriptive figure.

(c) The maximum day-yield three times reached or exceeded ("revised maximum") is a useful figure for such a purpose. It bears a close relationship to the total yield of a normal lactation, and shows rather less variation than that total. It is outside two of the most active external influences, namely length of lactation and time of service, and it is suggested that general environment has a minimum effect on it. Further, a cow can usually be judged within a few weeks of calving, since normal lactation totals can be estimated from the R.M. with considerable accuracy.

(d) By making a few rough corrections to the R.M. (easily embodied in a table) for age of cow and season of calving, the most frequent range of variation found from year to year in the same cow can be reduced from seven quarts to three and a half quarts. It has not yet been found possible to bring it below this figure.

In conclusion, the author must thank Mr. A. V. Hill and Mr. G. Udny Yule for their valuable criticisms and suggestions. He also wishes to express his thanks to Lord Rayleigh and Mr. E. G. Strutt, firstly for appointing him to this study and secondly for their consideration and advice throughout the two years during which the work has been in progress.

Any useful results that may be obtained by the investigation of their records is of course entirely owing to them, but for any deficiencies in method, or treatment of the material, the author is alone responsible.

THE DONCASTER SHOW, 1912.

HAPPILY it is extremely rare that the Society has to cope with difficulties of the magnitude of those which arose at Doncaster, and it is a matter of satisfaction that under all the circumstances the Show was carried through with comparatively small financial loss. The outbreaks of foot-and-mouth disease in the country and the consequent absence of the cattle, sheep and pigs was no light blow, and might have had most disastrous effects on the success of the Exhibition.

Although foot-and-mouth disease was reported to have broken out in the neighbourhood of Penrith on Sunday, June 23, it was not until the afternoon of the following Friday (June 28) that an intimation was received by the Secretary of the Society at Doncaster of the fact that the disease had been confirmed in cattle in Stanley Market, Liverpool, on the previous Monday. It was stated in the telegram from the Board of Agriculture that the destination of certain of the animals which had been exposed in the market was not definitely known, but that there was strong probability that some had been moved to Leeds and Wakefield.

A conference was immediately arranged by telegram that evening in London between the Officials of the Board of Agriculture and Sir Gilbert Greenall, Sir John McFadyean, and the Secretary, as the result of which it was decided to take special precautions in examining the animals coming to the Show not only at the Showyard entrance, but also at the Doncaster Railway Stations. To carry out this arrangement the Society had to obtain the services of additional veterinary inspectors, and the greatest possible care was exercised in connection with the exhibits.

At a late hour on the Sunday night (June 30) a telegram in the following terms was received by Sir Gilbert Greenall from the Board of Agriculture :

"Until we know that foot-and-mouth disease has not spread into the districts into which Irish cattle were scattered last week, namely, Gateshead, Malpas, Derby, Nottingham, Wakefield, and Leeds, there is the risk of the Board having to issue a General Stand-Still Order for all England and Wales at any time within the next few days.

"It might be possible for the Board to make special arrangements for cattle, sheep, and pigs to be sent home from the Royal Show, but the exhibitors should be made aware of the fact that at the best, even with

exhibition animals, freedom of movement may now be greatly restricted at any moment.

"It is, moreover, possible, that infection may be conveyed to the Show, although with show animals this seems to be unlikely. If any animal has run any risk of contact with suspected animals it should certainly be sent back from Doncaster without being allowed to be untrucked to-morrow morning.

"Since these directions were received the disease has been found to exist at Reid's, Lupset Pastures, Wakefield. Order will issue to-night."

On receipt of this, the Honorary Director and the Secretary, with such Members of Council as were at Doncaster and could be got together at that late hour, held a hurried meeting to discuss the situation. It was then decided to distribute copies of this telegram to all those in charge of stock, with a note in the following words :

Exhibitors or those in charge of cattle, sheep, or pigs, may make arrangements for the immediate removal of their stock, should they think it desirable.

GILBERT GREENALL, *Honorary Director.*

It was then midnight on the Sunday, but the message was sent over the telephone to Sheffield, copies were printed and brought to Doncaster by motor, and by daybreak on Monday, had been distributed to all the men in charge of cattle, sheep and pigs.

Up to this time, there was still the possibility of an exhibition of stock. The final blow, however, came at 8.45 that Monday morning, when the following telegram was received from the Board of Agriculture :

"Board are making Order prohibiting exhibition cattle, sheep, swine, Doncaster."

Arrangements were immediately made with the railway companies for the removal of the stock, and an Inspector of the Board arrived in the yard during the morning, for the purpose of issuing permits for the animals to leave, a task which was not finished until a late hour that evening. No less than 2,249 entries were involved, and about fifteen hundred of these had actually reached the Showyard, while the others were in various stages of transit.

Such excellent arrangements were made by the railway companies with the assistance of the Show officials that all the animals in the prohibited sections had been despatched from the Show before the doors were thrown open to the public on the morning of Tuesday, July 2. As a mark of their appreciation of the excellent services rendered by Mr. George Bolt, Divisional Superintendent of the Great Northern Railway, the Council requested Mr. Bolt to accept a piece of

plate, which was presented to him by Lord Middleton, the President of the Society.

What might have been a serious complication of the difficulties at Doncaster was the fact that there were present in the Showyard eight Kerry and Dexter animals, the property of Mr. R. Tait Robertson, which, it afterwards transpired, had come over from Dublin in a boat with other cattle amongst which a case of foot-and-mouth disease was detected. As a measure of precaution, the Board of Agriculture ordered the slaughter of these animals; and, after valuation, they were taken to the abattoirs in Doncaster and killed. No trace of disease was, however, found in any of them.

It such trying circumstances, it is gratifying to record that the Honorary Director was most loyally supported in his arduous duties by the Stewards and Members of Council present, and more particularly by the Steward of Veterinary Arrangements (Mr. Cyril Greenall), the Chief Veterinary Officer (Mr. John Malcolm, F.R.C.V.S.), the Veterinary Inspector on duty (Mr. Lloyd Jones, M.R.C.V.S., of Doncaster), and Professor Macqueen, F.R.C.V.S., who arrived specially on Saturday, June 29, to assist the Chief Officer. Mr. Percy Abson, M.R.C.V.S., and Mr. J. H. Gillespie, M.R.C.V.S., of Doncaster, examined the live stock arriving in Doncaster by train at the several landing docks during the nights of Saturday and Sunday prior to the Show, and Mr. R. A. H. Tovey (Town Clerk) rendered service in connection with the arrangements with the railway company for carrying out the above-mentioned veterinary examinations.

The Society has now held its annual exhibition in the county of York on seven occasions, but only once previously has it been at Doncaster—and that twenty-one years ago. The statement below contains details of all these Royal Shows in Yorkshire, and not the least interesting of these details are the financial results, which it will be seen have varied between a profit of 5,190*l.*, at York in 1883, and a loss of 3,465*l.* at the same place in the year 1900.

| Year | Place of Meeting. | President | Imple- ments entered | Entries of live stock | Number of persons admitted | + = Profit - = Loss |
|------|-------------------|---------------------------|----------------------------|-----------------------------|----------------------------------|------------------------|
| | | | | | | £ |
| 1848 | York . . | Earl of Yarborough . . | 1,508 | 718 | Norecord | - 2,826 |
| 1861 | Leeds . . | Earl of Powis | 5,488 | 1,027 | 145,728 | + 4,470 |
| 1873 | Hull . . | Earl Cathcart | 5,634 | 1,145 | 104,722 | - 414 |
| 1883 | York . . | Duke of Richmond & Gordon | 6,058 | 1,653 | 124,117 | + 5,190 |
| 1891 | Doncaster | Earl of Ravensworth . . | 5,347 | 2,221 | 111,500 | + 104 |
| 1900 | York . . | H.R.H. Prince of Wales. . | 4,933 | 1,997 ¹ | 87,511 | - 3,465 |
| 1912 | Doncaster | Lord Middleton | 5,210 | 3,022 ² | 90,139 | - 1,233 |

¹ No pigs exhibited.

² Cattle, sheep and pig sections cancelled.

If the results of all the above Shows are taken together and the total losses are subtracted from the total profits, it will be found that the Society are no less than 1,826*l.* to the good on these seven exhibitions.

The large debit balance on the Show of 1900 was to some extent due to the fact that there was no mutual working arrangement agreed upon that year between the County Society and the Royal; they both held their Shows, and both suffered in consequence. In 1912, however, the relations between the Royal Agricultural Society and the Yorkshire and Doncaster Agricultural Societies were of the most cordial character. It was, in fact, on the suggestion of the Yorkshire Society that their county was visited by the Royal. In consideration of their holding no Show of their own for the year, the members of the Yorkshire and Doncaster Societies were granted Show privileges at Doncaster, and this fusion of interests was doubtless responsible in a large measure for the Society being so well supported in the county.

The Showyard was situated inside the race-course on the Town Moor, where the historic "St. Leger" is run annually. The area occupied by the Society was 103 acres, or 23 acres more than was covered on the occasion of the last Doncaster Show. The Society this time found it unnecessary to erect the familiar black-and-white Entrance buildings, for the Race Committee kindly placed at the Society's disposal their permanent entrances and buildings, which were admirably adapted to the requirements of the Show, providing accommodation for all the usual offices "at the front." In this and many other ways the Race Committee greatly assisted in carrying out the necessary arrangements for the Show, under the able guidance of their Chairman, Mr. Councillor Wightman.

Extensive alterations to the race-course and stands were carried out in the spring prior to the Show, and on account of the low-lying nature of the ground in parts of the Showyard considerable drainage operations were rendered necessary. Difficulties were experienced in planning the whole of the amount of shedding necessary owing to the formation of the site, which was pear-shaped, but these difficulties were successfully overcome.

The Show opened at Doncaster on Tuesday, July 2, and closed on Saturday, July 6. The excellent entry of horses was, fortunately, unaffected by the Order of the Board of Agriculture, but the Show officials had in the weather another enemy to contend with on the opening day. The conditions, indeed, were so bad that morning that the judging of the horses had to be postponed until the afternoon. Although the rain ceased for a short time when the Judges did eventually

commence their duties, it soon commenced again, and the downpour continued for the rest of the day.

A special meeting of the Council was held in the afternoon of Tuesday, when the Honorary Director reported the steps he had taken in connection with the Order of the Board of Agriculture. The Council then unanimously approved the action of Sir Gilbert Greenall, and they also requested Lord Middleton to inform Mr. Runciman that they thoroughly supported his action.

In addition to the horses, there were many things to be seen in the Showyard by visitors, including the Implements and Machinery, the Working Dairy, exhibits of Poultry and Produce, and the Agricultural Education and Forestry Exhibitions.

The number of persons who passed through the turnstiles on the opening day was 1,377.

In the early morning of Wednesday there was more rain, but although the sky was for the most part overcast, it was fine for the rest of the day. The ground by this time was showing the effects of the wet, but, with the aid of many loads of straw and railway sleepers, which were put down in the worst places, the "going" was greatly improved. At half-past one Prince Arthur of Connaught arrived at the Show, where he was received by Lord Middleton and other Members of the Council. After luncheon in the Royal Pavilion as the guest of the President, His Royal Highness commenced a tour of the Showyard, driving first of all to the Stand of the Commonwealth of Australia. The Working Dairy, Forestry, Agricultural Education and Horticultural Exhibitions were then visited in turn, and having inspected the exhibits in each of these sections, the Prince drove through the Implement Yard to the Grand Stand, where from the Royal Box he was an interested onlooker during the Jumping Competitions and other events in the Horse Ring. Tea was taken by Prince Arthur in the Royal Pavilion at 5 p.m., and His Royal Highness left the Showyard in time to catch the 6.20 train back to London.

The Horticultural Exhibition was opened to the public in the afternoon, and as some compensation for the absence of the cattle, sheep and pig exhibits, no charge for admission to this department was made.

The number of persons paying for admission on this, the first half-crown day, was 10,780.

On the evening of Wednesday the Council of the Society were entertained at a banquet given by the Mayor of Doncaster in the Guildhall, at which, amongst others, Lord Lucas, Parliamentary Secretary of the Board of Agriculture, was present.

On Thursday, the General Meeting of Governors and Members of the Society was held in the large tent at noon. In opening the proceedings, Lord Middleton remarked that they met together that day under perhaps the most remarkable circumstances that had occurred in the history of the Society—he referred to the closing of sections of the Show owing to the outbreaks of foot-and-mouth disease. In these outbreaks, his Lordship said, immediate and stringent steps had to be taken, and it was the best and only course that could have been taken under the circumstances. (A full report of the proceedings at the General Meeting is given on pp. xxvii to xxxii).

An entirely new departure in the Society's Showyard was the exhibition of the National Terrier Club, which was opened on Thursday, and continued on the following day.

The total attendance on Thursday was 18,914. On Friday, the first shilling day, the numbers reached 39,254. On the last day, Saturday, only 19,814 persons paid for admission. The daily attendances at different hours with figures for previous Shows are given in the tables below.

Comparative statements of entries will also be found on pp. 181 and 182.

(1) *Admissions by Payment at Doncaster, 1912.*

| Day of Show | 11 a.m. | 1 p.m. | 3 p.m. | 5 p.m. | Day's total |
|-----------------------------|---------|--------|--------|--------|-------------|
| Tuesday (5s.) | 664 | 1,111 | 1,338 | 1,373 | 1,377 |
| Wednesday (2s. 6d.) | 3,281 | 7,651 | 10,265 | 10,753 | 10,780 |
| Thursday (2s. 6d.) | 6,142 | 13,339 | 18,153 | 18,853 | 18,914 |
| Friday (1s.) | 15,780 | 30,606 | 37,735 | 39,139 | 39,254 |
| Saturday (1s.) | 5,954 | 12,691 | 17,788 | 19,711 | 19,814 |
| Total Admissions | | | | | 90,139 |

(2) *Total daily admissions at the 1912 Show, compared with the previous six Shows and the Doncaster Show of 1891.*

| Prices of Admission | Don-caster, 1912 | Nor-wich, 1911 | Liver-pool, 1910 | Glouce-ster, 1909 | New-castle, 1908 | Lincoln, 1907 | Derby, 1906 | Don-caster, 1891 |
|---------------------------------------|------------------|----------------|------------------|-------------------|------------------|---------------|----------------------|------------------|
| Half-crown (Imple-ment Yard only) . . | — | — | — | — | — | — | — | 344 |
| Five Shillings | 1,377 | 878 | 2,492 | 1,492 | 2,397 | 1,680 | 2,752 | 2,681 |
| Half-crown | 10,780 | 7,140 | 19,646 | 20,019 | 32,142 | 22,835 | 25,666 | 12,331 |
| Half-crown | 18,914 | 20,442 | 30,193 | 15,452 | 28,880 | 22,725 | — | 18,530 |
| One Shilling | 39,254 | 75,266 | 44,327 | 30,281 | 98,489 | 51,888 | 46,055 | 57,580 |
| One Shilling | 19,814 | 17,739 | 41,154 | 21,152 | 51,959 | 33,878 | 44,670 | 20,034 |
| Totals | 90,139 | 121,465 | 137,812 | 88,396 | 213,867 | 133,006 | 119,143 ¹ | 111,540 |

¹ Derby, 1906—Only one Half-crown day.

Entries of Live Stock, Poultry, and Produce.

| | Don- caster 1912. | Norwich, 1911 | Liver- pool, 1910 | Glou- cester, 1909 | New- castle, 1908 | Lincoln, 1907 | Derby, 1906 | Park Royal, 1905 | Don- caster, 1891 |
|-------------|-------------------------|------------------|-------------------------|--------------------------|-------------------------|------------------|----------------|------------------------|-------------------------|
| Horses . . | 1773 | 1716 | 1686 | 1599 | 1664 | 1506 | 1563 | 1372 | 713 |
| Cattle . . | 1,089 | 1,065 | 1958 | 11,146 | 1948 | 1,030 | 1926 | 898 | 661 |
| Sheep . . | 734 | 746 | 772 | 1802 | 1695 | 1672 | 1564 | 591 | 643 |
| Pigs . . | 426 | 416 | 361 | 433 | 312 | 368 | 266 | 252 | 204 |
| Total . . | 3,022 | 2,943 | 2,757 | 2,980 | 2,619 | 2,576 | 2,319 | 2,113 | 2,221 |
| Poultry . . | 1,242 | 1,218 | 1,195 | 754 | 768 | 826 | 811 | 871 | 800 |
| Produce . . | 559 | 670 | 701 | 765 | 416 | 572 | 525 | 493 | 425 |

¹ Exclusive of Double Entries.

² Exclusive of Draught Horses and the Harness Classes.

Shedding in Implement Yard (in feet).

| Description of Shedding | Don- caster, 1912 | Norwich, 1911 | Liver- pool, 1910 | Glou- cester, 1909 | New- castle, 1908 | Lincoln, 1907 | Derby, 1906 | Park Royal, 1905 | Don- caster, 1891 |
|---|-------------------------|------------------|-------------------------|--------------------------|-------------------------|------------------|----------------|------------------------|-------------------------|
| Ordinary . . | Feet 7,050 | Feet 6,690 | Feet 7,590 | Feet 7,575 | Feet 6,490 | Feet 7,650 | Feet 7,818 | Feet 6,590 | Feet 8,343 |
| Machinery . . | 3,125 | 3,095 | 2,555 | 2,420 | 2,585 | 2,165 | 2,520 | 1,750 | 2,106 |
| Special . . (Seeds, Models, &c.) | 3,363 | 3,907 | 3,420 | 2,891 | 2,960 | 3,251 | 2,692 | 1,629 | 2,024 |
| Total . . [Exclusive of open ground space] | 13,538 | 13,692 | 13,565 | 12,886 | 12,035 | 13,066 | 13,030 | 9,969 | 12,473 |
| No. of Stands | 442 | 457 | 454 | 437 | 389 | 417 | 424 | 289 | 421 |

DESCRIPTION OF EXHIBITS.

The particulars which follow are in almost every case taken from the reports sent in by the Judges of the different classes. A complete list of the awards, with information as to exhibitors, breeders, pedigrees, &c., of the animals gaining prizes is given in the Appendix, prefaced by the names of the Stewards and Judges in the various departments (see pp. xlvii to lxxxix.).

HORSES.

As in 1891, the exhibition of horses was well worthy of the county in which the Show was held, and on only three occasions has the number of horses entered (713) been exceeded, viz., 981 at Manchester, in the Diamond Jubilee year, 1897; 972 at Windsor, in 1889 (the year of the Society's Jubilee); and 815 at Kilburn, in 1879. Under a new regulation, stallions with Government certificates of soundness for the year were exempted from veterinary examination in the Showyard. For the first time a class was included in the Hunter section for thoroughbred brood mares, entered or eligible for entry in

COMPARATIVE STATEMENT OF ENTRIES, ETC.,
AT THE LAST TWO SHOWS HELD AT DONCASTER IN 1891 AND 1912.

| HORSES AND CATTLE | 1891 | | 1912 | | SHEEP, PIGS, POULTRY, PRODUCE | 1891 | | 1912 | |
|----------------------------|---------|---------|---------|--------------------|-------------------------------------|---------|---------|---------|-------------|
| | Classes | Entries | Classes | Entries | | Classes | Entries | Classes | Entries |
| HORSES:— | | | | | SHEEP:— | | | | |
| <i>Prizes</i> | | £1,805 | | £3,726 | <i>Prizes</i> | | £1,170 | | £1,825 10s. |
| Shire | 7 | 164 | 10 | 131 | Oxford Down | 4 | 39 | 5 | 42 |
| Clydesdale | 7 | 57 | 8 | 47 | Shropshire | 4 | 182 | 6 | 72 |
| Suffolk | 5 | 41 | 8 | 48 | Southdown | 4 | 81 | 6 | 68 |
| Hunter | 11 | 191 | 13 | 121 | Hampshire Down | 4 | 50 | 6 | 71 |
| Polo Pony | — | — | 5 | 47 | Suffolk | 4 | 32 | 6 | 25 |
| Cleveland Bay or | | | | | Dorset Down | — | — | 3 | 12 |
| Coach Horse | 7 | 73 | 5 | 23 | Dorset Horn | — | — | 4 | 25 |
| Hackney | 10 | 127 | 9 | 103 | Ryeland | — | — | 3 | 13 |
| Hackney Pony | 4 | 28 | 4 | 18 | Kerry Hill (Wales). | — | — | 2 | 7 |
| Shetland Pony | — | — | 2 | 13 | Lincoln | 4 | 57 | 7 | 69 |
| Welsh Pony | — | — | 2 | 10 | Leicester | 4 | 36 | 4 | 23 |
| Riding Classes | — | — | 11 | 115 | Border Leicester | 3 | 30 | 3 | 40 |
| Harness Classes | 2 | 18 | 12 | 166 | Wensleydale | 4 | 41 | 6 | 39 |
| Draught Horse | 2 | 14 | — | — | Lonk | 3 | 7 | 2 | 6 |
| Jumping | — | — | 4 | 64 | Derbyshire Gritstone | — | — | 2 | 7 |
| Pit Ponies. | — | — | 2 | 29 | Kent or Romney | | | | |
| | | | | | Marsh | — | — | 6 | 95 |
| | | | | | Cotswold | 4 | 24 | 4 | 16 |
| | | | | | Devon | — | — | 3 | 11 |
| | | | | | South Devon | — | — | 5 | 15 |
| | | | | | Dartmoor. | — | — | 2 | 7 |
| | | | | | Exmoor | — | — | 3 | 9 |
| | | | | | Cheviot | 3 | 16 | 3 | 12 |
| | | | | | Herdwick | 3 | 22 | 3 | 12 |
| | | | | | Welsh | — | — | 2 | 15 |
| | | | | | Black-faced | | | | |
| | | | | | Mountain | 3 | 26 | 2 | 23 |
| Total for HORSES | 55 | 713 | 95 | 935 ¹ | Total for SHEEP | 51 | 643 | 98 | 734 |
| CATTLE:— | | | | | PIGS:— | | | | |
| <i>Prizes</i> | | £1,500 | | £2,770 10s. | <i>Prizes</i> | | £432 | | £762 5s. |
| Shorthorn | 7 | 135 | 17 | 386 | Large White | 4 | 33 | 8 | 147 |
| Lincolnshire Red | | | | | Middle White | 4 | 26 | 6 | 67 |
| Shorthorn | — | — | 8 | 49 | Small White | 4 | 20 | — | — |
| Hereford | 6 | 62 | 8 | 113 | Tamworth | 4 | 56 | 6 | 41 |
| Devon | 4 | 24 | 7 | 36 | Berkshire. | 4 | 55 | 6 | 52 |
| South Devon | — | — | 5 | 14 | Black | 4 | 14 | 6 | 68 |
| Longhorn | — | — | 4 | 18 | Lincolnshire Curly- | | | | |
| Sussex | 4 | 32 | 6 | 24 | coated | — | — | 6 | 51 |
| Welsh | 2 | 10 | 4 | 11 | Total for PIGS | 24 | 204 | 38 | 426 |
| Red Poll | 4 | 30 | 5 | 56 | TOTAL FOR STOCK | 183 | 2,221 | 354 | 3,389 |
| Aberdeen Angus | 4 | 27 | 6 | 71 | POULTRY:— | | | | |
| Galloway | 4 | 24 | 5 | 39 | <i>Prizes</i> | | £343 | | £400 |
| Highland | — | — | 2 | — | | 98 | 800 | 130 | 1,245 |
| Ayrshire | 2 | 7 | 3 | 12 | PRODUCE:— | | | | |
| British Holstein | — | — | 4 | 37 | <i>Prizes</i> | | £376 | | £294 10s. |
| Jersey | 6 | 190 | 8 | 120 | | 34 | 425 | 58 | 559 |
| Guernsey | 4 | 51 | 6 | 49 | | | | | |
| Kerry | 2 | 25 | 4 | 30 | | | | | |
| Dexter | 2 | 33 | 4 | 38 | | | | | |
| Dairy Cows | 2 | 11 | 3 | 24 | | | | | |
| Milk Yield | — | — | 12 | 120 | | | | | |
| Butter Test | — | — | 2 | 47 | | | | | |
| Total for CATTLE | 53 | 661 | 123 | 1,294 ¹ | | | | | |

NOTE.—In 1912 the exhibition of Cattle, Sheep, and Pigs was prohibited by order of Board of Agriculture.

Grand Totals for
LIVE STOCK, POULTRY, } 542 Classes . 5,193 Entries . £10,900 ² Prizes
and PRODUCE in 1912. }

¹ Animals exhibited in more than one class are here counted as separate entries.

² Including £485 for Farm Prizes, £350 for Horticultural Exhibition, £149 for Competitions.

the General Stud Book, up to weight, with foal at foot ; and this brought out some useful animals. In addition to the prizes for the brood mares, there were two prizes of 5*l.* each for the best colt foal and for the best filly foal exhibited with their dams. Two classes were also included in the prize-list for Pit Ponies.

Shires.—The classes devoted to this breed numbered ten in all, and the quality throughout was exceptionally good. Class 1 (yearling colts) was headed by *Champion's Goalkeeper*, which was an outstanding winner. Second came *Moors Bridegroom*, not quite so heavy as the leader, but full of quality, and followed by a lot of very useful colts. In Class 2 (stallions foaled in 1910) a good winner was found in *Tandridge Coming King*, a colt very full of Shire character and an excellent mover, which afterwards won the Championship of the male section (see Fig. 1). *Blacklands Kingmaker*, bigger than the leader, but not so full of character, was a good second. The rest of the class was made up of a lot of very useful weighty colts. Class 3 (three-year-old stallions) was not quite so strong as the two preceding classes. *King Premier*, a useful weighty colt, was first, being closely followed by *Gaer Right Sort*. The yearling fillies (Class 4) made one of the strongest in the female section, and an easy winner was found in *Leek Dorothy*. The second, *Tandridge Rosette*, was closely followed by *Biddulph Blanche*. The two-year-old fillies in Class 5 were a very good lot, and were led by *Marden Constance*, closely followed by *Halstead Duchess 7th* ; the rest of the class were useful fillies. The three-year-old fillies were not quite so strong in number, but the first four were of exceptional merit. *Lorna Doone*—(see Fig. 2)—the Champion in the female section, was easily first in this class, being followed by *Halstead Royal Duchess*, a filly of less scale, but very full of character ; and *Tandridge Delight*, a bigger filly, but not quite in same bloom. In Class 7 (mare, with foal at foot, foaled in or after 1908), the winner was found in *Silfield Belle*. The second prize was won by *Yatesbury Sunlight*, and the third by *Caronia*, three mares of nice Shire character. Class 8 (mare with foal at foot, foaled in or before 1907) was a strong one, and easily led by the well-known *Mollington Movement*. The Royal Show being rather early in the year for foals, most of the exhibits in Class 9 were rather young, but Mr. Edward Porter had an outstanding winner in his *Babingley Nulli Secundus* foal, Mr. A. H. Clark being second with another by the same sire. The filly foals (Class 10) was the weakest in this section, Mr. B. N. Everard's *Bardon Forest Premier* foal taking first place, followed by the *Dowsby Forest King* foal, exhibited by Mr. Leopold Salomons.

Clydesdales.—The stallions made a good average show, especially the two-year-old colts, from which was selected the Champion, *The Dunure* (see Fig. 3), and the Reserve Champion, both of which animals were typical Clydesdales. The females were above the average, with a lot of first-class animals among them, especially the first and second prize two-year-old fillies, and the first prize brood mare, *Boquhan Lady Peggy* (see Fig. 4), which also secured the Female Championship.

Suffolks.—The Suffolk horses made an excellent display in spite of the fact that Doncaster is a long way from the home of the breed. The two-year-old class was headed by a very large weighty colt that looked like growing into a valuable sire. The champion horse, *Sudbourne Peter* (see Fig. 5) was found amongst the three-year-olds; long, low, with plenty of bone, this animal has had a most successful showyard career, and was well worthy of his position. The mare and filly classes were exceptionally good; the animals in the first and second positions were difficult to separate, and, on the whole, the Judges were well pleased with the animals that were placed before them.

Hunters.—With the exception of Class 68 (riding mares or geldings, foaled in 1908, up to more than 14 stones) the animals in this section were a very creditable lot. The thoroughbred mares in Class 33 were very good and the Judges considered that Lord Middleton's *Fair Geraldine* (see Fig. 7) was one of the best brood mares they had ever seen. Class 67 was another good class, *Royal Mint* being an exceptionally fine mover. *Alarm*, the winner in Class 70, stood out by himself, being such a fine galloper for a strong horse. The Champion medal for the best filly was awarded to *Red Squaw* (see Fig. 6).

Polo and Riding Ponies.—The Judges considered that the ponies which came before them in the various classes were much superior in quality as a whole to any they have had the pleasure of judging before at any Show. There was hardly a weak class either in numbers or quality, and great quality was shown in the classes for young ponies.

The winner in Class 40 (stallion, foaled in or before 1909, not exceeding 15 hands) was a beautiful type of pony, full of quality and a grand mover. He gained the Male Championship (see Fig. 8). The second also had much quality, but was not so good in the hocks. The third prize went to a typical pony for getting weight carriers, but slightly lacking in quality. There were several other ponies in this class of great quality. Class 41 (colt, filly or gelding foaled in 1911) was a very strong one and there was little to choose between the first and second; they both looked like making grand polo ponies. The third prize winner was a sweet filly of true polo type.



FIG. 1.—SHIRE STALLION, "TANDRIDGE COMING KING."

*Winner of Champion Prize for best Shire Stallion, Doncaster, 1912.
Exhibited by MESSRS. JAMES FORSHAW AND SONS.*



FIG. 2.—SHIRE FILLY, "LORNA DOONE."

*Winner of Champion Prize for best Shire Mare or Filly, Doncaster, 1912.
Exhibited by MESSRS. W. AND H. WHITLEY.*



FIG. 3.—CLYDESDALE STALLION, "THE DUNRE."

Winner of Champion Prize for best Clydesdale Stallion, Doncaster, 1912.

Exhibited by MR. W. DUNLOP.



FIG. 4.—CLYDESDALE MARE, "BOQUHAN LADY PEGGY."

Winner of Champion Prize for best Clydesdale Mare or Filly, Doncaster, 1912.

Exhibited by MR. STEPHEN MITCHELL.



FIG. 5.—SUFFOLK STALLION, "SUDBOURNE PETER."
Winner of Champion Prize for best Suffolk Stallion, Doncaster, 1912.
Exhibited by MR. KENNETH M. CLARK.



FIG. 6.—HUNTER FILLY, "RED SQUAW."
Winner of Champion Prize for best Hunter Filly, 3 years and under, Doncaster, 1912.
Exhibited by MR. J. L. NICKISSON.



FIG. 7.—THOROUGHERD MARE, "FAIR GERALDINE."

*Winner of Champion Prize for best Hunter Mare, 4 years and upwards, Doncaster, 1912.
Exhibited by LORD MIDDLETON.*



FIG. 8.—POLO AND RIDING PONY STALLION, "NAVAL SCARE."

*Winner of Champion Prize for best Polo and Riding Pony Stallion or Colt, Doneaster, 1912.
Exhibited by MR. JOHN BELL.*



FIG. 9.—POLO AND RIDING PONY MARE, "PATRICIA."

Winner of Champion Prize for best Polo and Riding Pony Mare or Filly, Doncaster, 1912.
Exhibited by MR. TRESHAM GILBEY.



FIG. 10.—CLEVELAND BAY STALLION, "KING GEORGE 5TH."

Winner of Champion Prize for best Cleveland Bay Stallion, Doncaster, 1912.
Exhibited by MR. GEORGE SCOBY.



FIG. 11.—CLEVELAND BAY FILLY, "AISLABY STARLIGHT."
Winner of Champion Prize for best Cleveland Bay Mare or Filly, Doneaster, 1912.
Exhibited by MR. GEORGE ELDERS.



FIG. 12.—COACHING STALLION, "RENOWN."
Winner of Champion Prize for best Coaching Stallion, Doneaster, 1912.
Exhibited by MR. FRANK H. STERICKER.



FIG. 13.—COACHING MARE, "RILLINGTON ATTRACTION."
Winner of Champion Prize for best Coaching Mare or Filly, Doncaster, 1912.
Exhibited by MR. JOHN LETT.



FIG. 14.—HACKNEY STALLION, "SPARKLING DANEGELT"
Winner of Champion Prize for best Hackney Stallion, Doncaster, 1912.
Exhibited by SIR WALTER GILBEY, BART.



FIG. 15.—HACKNEY MARE, "BECKINGHAM LADY GRACE."
Winner of Champion Prize for best Hackney Mare or Filly, Doncaster, 1912.
Exhibited by MR. FRANK J. BATCHELOR.



FIG. 16.—SHETLAND PONY MARE, "THORALIND."
Winner of Champion Prize for best Shetland Pony, Doncaster, 1912.
Exhibited by MR. WILLIAM MUNGALL.



FIG. 17.—WELSH PONY STALLION, "BLEDFA SHOOTING STAR"
Winner of Champion Prize for best Welsh Pony Stallion, Doncaster, 1912.
Exhibited by SIR WALTER GILBEY, BART.



FIG. 18.—WELSH PONY MARE, "CLUMBER BLACKY."
Winner of Champion Prize for best Welsh Pony Mare, Doncaster, 1912.
Exhibited by THE DUCHESS OF NEWCASTLE.

Class 42 (colt, filly or gelding foaled in 1910) was particularly strong and the Judges were much impressed by the size and quality of the fillies. The first prize winner was a very fine pony with great bone and substance, and the second was a lovely filly of great quality, but of course had not the bone of the winner. The third and fourth were also of great promise, and there were several more in the class which looked like making first rate ponies. Class 43 was the weakest that came before the Judges, although the winner was a very nice pony with quality and a fine riding shoulder. The second prize winner was full of quality but very big.

Class 44 (mare, with foal at foot, not exceeding 14·2 hands) although not very strong in numbers was very good as regards the quality of mares. The three prize-winners were all typical mares for breeding polo ponies, and although the mare placed reserve in the class was showing signs of age, she had a lovely foal at foot to which was awarded the Bronze medal of the Polo and Riding Pony Society. The first prize winner was also made Champion (see Fig. 9).

Cleveland Bays and Coach Horses.—The classes as a whole were a very creditable show, typical specimens of each breed were exhibited, and the numbers were fairly good.

Though only four animals were exhibited in Class 45 (stallion foaled in or before 1908), difficulty arose as to the respective merits, the general excellence being well maintained throughout; and Class 46 (young stallions) proved that great pains are still taken in producing the best. The classes of mares and fillies, though small, brought out some animals of special merit.

The Champion prizes given by each Society were awarded to the animals which are the subjects of illustration in Figs. 10 to 13.

Hackneys.—The Judges stated that the Hackneys were a grand lot, in fact they did not remember seeing so many good ones at any Show before. Mr. Batchelor's mare, *Beckingham Lady Grace* (see Fig. 15), the Female Champion, is an extraordinary animal, and the younger classes were especially good. The Male Championship was awarded to Sir Walter Gilbey's *Sparkling Danegelt*, first prize winner in Class 52 (see Fig. 14).

The Ponies were also very good, in fact all the best ponies in the world could be seen that day.

Shetland Ponies.—The ponies of this breed at the Doncaster Show were of a high order of merit; in fact there was not a bad one in the lot. The stallion class contained eight excellent ponies, and a very level bunch they were. The class for mares with foals at foot was weak in numbers, but the first and second prize winners were outstanding mares.

They also stood at the top for the Championship of the breed, which was gained by *Thoralind* (see Fig. 16).

Welsh Ponies.—These were not numerous, but representative and good. Sir Walter Gilbey's famous *Bleddfa Shooting Star* (see Fig. 17) won the first prize in the stallion class and Championship, followed by Mrs. Greene's *Grove Ballistite* and *Grove Arclight*. In the mare class two new representatives came to the front, owned by the Duchess of Newcastle, which were rather blood-like, but went so correctly and well as to easily secure their position. The Silver Medal for the best mare went to her Grace for *Clumber Blacky* (see Fig. 18).

Park Hacks and Riding Ponies.—Class 74 was a small one, numbering five animals, the winner of the first prize standing out by herself. Class 75 was moderate, but the winner a true goer and up to weight. In Class 76 competition between the first and second prize winners was close, the third prize animal being also a valuable horse somewhat of the hunter rather than hack type. In Class 77 there were only three exhibits, the winner having no trouble in taking the red rosette. The Challenge Cup was taken by the winner of Class 76, the winner of Class 74 being reserve. Both these animals showed quality and were excellent rides.

Though numerically the Hacks and Riding Ponies Classes were small, the varied exhibits, with but very few exceptions, showed considerable quality, and possessed those points most desirable in riding horses, especially manners and balance, two most important points in a hack.

Pit Ponies.—The two classes for Pit Ponies were well filled with fairly good specimens of the animals used in the Doncaster coal district, but there were none of the smaller sizes (9 to 10 hands) shown. There was no exhibit of outstanding excellence in either class.

POULTRY.

The Poultry Section at the Doncaster Show exceeded any previous exhibition in number of entries, and, as will be found from the Judges' Reports, the general excellence of the exhibit was quite exceptional, having regard to the season of year in which the Show is held.

A most interesting novelty was provided by Mr. Charles Thellusson, who exhibited (not for competition) a collection of twenty White Plymouth Rocks from his well-known poultry yards at Brodsworth Hall, near Doncaster. Mr. Thellusson stated that these White Plymouth Rocks originated about 1880, and were a small type of Barred Rock from which they are "sports." They have now become by breeding one of the largest fowls in England.

The task of awarding the prizes was divided amongst eight Judges. Mr. Ainscough judged the Game and Bantam classes ; Mr. Ardron, the Blue Wyandottes ; Mr. Goode, the other Wyandotte classes ; Dr. Jackson, Langshans, Plymouth Rocks, Minorcas, Leghorns and Anconas ; Mr. Lambert, the Dorkings, Sussex, British Rhode Island Reds, Brahmas, Cochins, Malines, Campines and French ; Mr. Wilkinson the Orpingtons ; Mr. Turrell the Yokohama and Yokohama Bantam classes ; and Mr. Kingwell the Ducks, Geese and Turkeys.

The *Old English Game* were a very nice collection as regards the old birds, and the outstanding exhibits of merit were Mr. Marsden's Spangled cock shown as hard as nails and Mr. Heath's Black-red cock, a bird remarkable for his sound black and beautiful top colour. The young birds were not numerous and were mostly too long in back. *Indian Game* made two very good classes, nearly every specimen being of the true type, the winning pullet shown by Messrs. Heys being especially good in marking and of the low set type. *Modern Game* provided two nicely filled classes for this time of the year, but some of these were shown rather rough in feathers. The winning Black-red cock was a real gem, standing well on his legs and being a very bright coloured bird. Mr. Taylor's winning hen was a great shaped one, shown in fine fettle. The *Old English Game Bantams* were not big classes but contained the best birds in the country, Mr. Dawson showing two very fine hens. The winner was a lovely shaped good coloured wheaten. *Modern Game Bantams* were a very good lot, the cock class being headed by Mr. Smith Lambert's Palace Cup cockerel (Black-red), a bird remarkable for his beautiful colour, being very small and neat as well. In hens, Mr. Brennand was first with a fine made one of good average colour. *Sebright Bantams* were not very numerous, but the winners shown by Miss Preston and Mr. Fish were good specimens of their breed.

The Any other Variety *Bantams* were big classes, and contained many real good birds, Mr. Smith Lambert winning in the cock class with a most perfect white Pekin. Mr. Entwisle's winning Polish hen is without doubt the best of her breed.

Mr. Ardron reports that the Blue *Wyandottes* were very disappointing in numbers, but the quality was good, particularly the winning cock, shown by Mrs. Holdsworth.

The other classes of *Wyandottes* taken throughout, Mr. Goode reports, were better in quality than in previous years. The Laced varieties, however, though good in quality, were low in numbers, partly accounted for by the difficulty that amateurs find in regard to the double mating required to produce typical

cockerels and pullets. In order to produce perfection in markings of plumage breeders of this variety of the Wyandotte family have sacrificed type, which is much to be regretted, as it involves a loss of the utility qualities of the breed. The White *Wyandotte* classes were excellent, both in point of numbers and the quality of the exhibits. Black *Wyandottes* were not high in quality. The quality of the Partridge and Columbians shown was good, but there were very few entries in the Spangled classes, and the variety superfluous. In the Any other Variety classes the entries were good, Buffs predominating.

Dr. Jackson, in his report, expresses the opinion that the *Langshans*, *Plymouth Rocks*, *Minorcas*, *Leghorns* and *Anconas* in the classes judged by him, taken as a whole, may be considered to be of exceptional merit, every variety being well patronised.

The thirty classes over which Mr. Lambert adjudicated contained just over 250 exhibits or a trifle over eight per class. For the time of year this was very satisfactory, the quality throughout being most remarkable. Most noteworthy in point of numbers were the *Sussex* fowls, *Rhode Island Reds*, *Malines*, *Campines*, *Faverolles*, and the competition for the prizes was very keen. There were also some notable exhibits in the remaining classes, including *Dorking*, *Brahmas*, *Cochins*, *French Houdans*, and also in the A.O.V. classes.

Mr. Wilkinson, in his report, said he had never seen a better lot of *Orpingtons* at the Royal Show than he had before him on this occasion. The Buffs, Whites and Blacks were especially grand in quality, and large in numbers. Several Crystal Palace winners were shown, and in one or two classes they were beaten, which speaks much for the quality of birds penned. The White and Buff hens were also extra fine specimens. The cockerels and pullets were exceptional in size as well as quality.

The *Yokohama* classes judged by Mr. Turrell consisted of some very good specimens, especially in the Bantam section. The first two winners in cocks and hens of this variety were by far the best *Yokohama* Bantams ever exhibited in England, of the black breasted red type and typical in every section. The white cock which won the special and first prize in the big class of *Yokohamas* was splendidly "put down," being of pure white plumage throughout, which is seldom seen.

Mr. Kingwell reports that the exhibits of ducks were, on the whole, the best seen at the "Royal" for many years. In the adult *Aylesbury* class, the first and second birds were two of the best possible for one exhibitor to show. They both had great size, depth, and colour, and were shown in faultless

condition. In the young *Aylesbury* class the winner stood well away, being a fine forward drake with good size and type. Adult *Rouens* made a very strong class. The winner here was a drake in full plumage, one of the finest ever penned, and for size and soundness of colour throughout he should stand as a model to all Rouen breeders. Young *Rouens* were a late hatched lot, but the class contained the best of quality. *Blue Orpingtons* were also good and came up well. The adult class for birds of "any other breed" had no less than six varieties. The winner is worthy of special note, being an Indian Runner drake with excellent head, reach, style and carriage. The young birds of "any other breed" made a nice class, and contained some very good *Buff Orpingtons* and *Runners*.

Ganders were a good even lot. The winner, an *Embsden*, stood well away for type, freeness of gullet and size, and is the best seen out this season. The first and second Geese were both of the *Toulouse* breed, and there was little to choose between them.

The Turkey classes contained many good birds, several of which were in rough condition, and many had crooked breast. The winners in both classes stood well out for size, colour, bone and condition.

PRODUCE.

Butter.—The entries in these classes numbered eighty-eight, and as regards colour, texture, freedom from moisture, appearance and finish, many of the exhibits were perfect. A number, however, were "lacking" as regards flavour, the only description possible for many of them being that they were insipid and had not the true nutty flavour peculiar to butter made from properly ripened cream; indeed in a number of samples it was difficult to realise from the taste that it was butter. As the greatest number of marks are awarded for flavour this is a most important point.

In Class 479, for boxes of twelve 2 lb. rolls, there was only one exhibit, to which the first prize was awarded. For the Channel Islands and Devon cattle classes the winner of the premier honours was not the same in each class. From inquiries since, the Judge has ascertained that in Class 482 the first prize winner made the butter from different cream to that from which was made the exhibit in Class 480, which did not win. For the two classes 481 and 483 for butter from other than Jersey or Devon cattle the first prize was won in each by the same exhibitor. It is a notable fact that one exhibit will often only gain a commendation in an unsalted class and will rise to a prize winner in a salted class, showing the effect that salt has in bringing out the flavour of butter. For Class

484, in which an extra twenty marks were given for packing, the entries were not numerous, but some of them were excellent. The first and second prize butter gained full marks for packing, and left little to be desired.

Cheese.—The quality in the Cheddar and Cheddar truckle classes was maintained, the cheese being well made, rich, and of good flavour, which will develop with a little age. The Double Gloucesters showed every indication of a good make this season. Nearly all the Stiltons were well made, of good quality, and only required time to mature into rich, ripe, and blue cheese. The classes for Wensleydales (Stilton and flat shape) were well filled, and the quality above the average, with all the points necessary to the making of the cheese perfection. The Cleveland cheese exhibits were characteristic of the finest make, and only want maturing. The Judge's opinion of the section as a whole was that it was above the standard.

The entries in Classes 487 and 488, for coloured and uncoloured Cheshire cheese, were very good, both as regards number of entries in each class and also the quality of the exhibits. Very few cheese were found in these classes that were not up to the mark. In fact they surpassed by far any cheese that Mr. Welsby, the Judge, had seen this season, either on the show bench or in the makers' rooms. One great feature was that the weather previous to the Show had been very suitable for cheese-making. In the Lancashire cheese class the entries were small, but quality made up for it. As all the leading makers were represented at Doncaster, this class was found most difficult to judge.

Bread.—Numerically the entries, compared with those of last year, were distinctly disappointing, there being only forty-nine entries against 120 at Norwich. In quality also the exhibits were disappointing. To produce a loaf of good appearance using stone-ground flour containing 85 per cent. of the wheat berry, the wheat being English grown, needs a process of manufacture which few bakers care to trouble about following; moreover such bread, on account of there being a limited demand, does not justify the baker in spending the time and trouble necessary to turn out bread that will give satisfaction. Only those bakers, therefore, who make special efforts to obtain good results, to secure prizes, make bread worth staging for exhibition purposes. It follows—and need not be a matter of surprise—that not more than a dozen of the loaves exhibited were found worthy of being called exhibition bread, the remainder in most cases being poor stuff. Many of the loaves sent in contained more than 85 per cent. of wheaten flour, and seven entries could be classed as wholemeal bread.

One of the entries was disqualified, the flour used in the making of the bread being without a doubt an English country patent.

In justice to the prize winners in the professional classes it should be stated that great pains and much care must have been expended to get their bread so near perfection ; some of this bread would have taken prizes at any show.

Cider and Perry.—The competition as a whole was somewhat disappointing both as regards quality and number of entries. The Cider classes, however, were appreciably stronger than those for Perry, which were decidedly weak and much below the average. Undoubtedly the 1911 vintage has not fulfilled expectations, many ciders of first-rate quality otherwise being marred by excessive bitterness. Of individual classes the most uniform degree of merit was met with in Class 503, for sweet bottled Cider made in 1911, there being several very good Ciders entered. The first prize awarded was given to a typical Devonshire Cider, which afforded an excellent example of the best qualities typical of that county's produce. This was also awarded the Champion Cup for the best Cider in the Show. Class 504 for old bottled Ciders contained a few good exhibits, but the classes for new and old draught Ciders were not distinguished. The Perry classes contained no really good exhibits.

Some disappointment to exhibitors would be avoided if some of them displayed more care as to their entries in the Dry and Sweet Ciders classes. Some very good exhibits had to be passed over unnoticed on account of entry in an unsuitable class.

The following are the chemical analyses of the prize-winning samples :—

CLASS 499.—*Casks of Dry Cider, of not less than 18 and not more than 30 gallons, made in 1911.*

| No. | Specific gravity | Alcohol | Solids | Acidity | Awards |
|-----|------------------|-----------|-----------|-----------|-----------|
| | | per cent. | per cent. | per cent. | |
| 290 | 1·013 | 5·7 | 5·24 | ·36 | 1st Prize |
| 289 | 1·015 | 6·2 | 5·66 | ·33 | 2nd Prize |

CLASS 500.—*Casks of Sweet Cider, of not less than 18 and not more than 30 gallons, made in 1911.*

| | | | | | |
|-----|-------|-----|------|-----|-----------|
| 300 | 1·029 | 4·2 | 8·60 | ·48 | 1st Prize |
| 297 | 1·029 | 4·3 | 8·59 | ·37 | 2nd Prize |
| 301 | 1·034 | 3·8 | 9·54 | ·58 | 3rd Prize |

CLASS 501.—*Casks of Cider, of not less than 18 and not more than 30 gallons, made previous to 1911.*

| No. | Specific gravity | Alcohol | Solids | Acidity | Awards |
|-----|------------------|------------------|-------------------|------------------|-----------|
| 305 | 1·024 | per cent. 2·4 | per cent. 6·56 | per cent. ·35 | 2nd Prize |

CLASS 502.—*One Dozen Bottles of Dry Cider, made in 1911.*

| | | | | | |
|-----|-------|-----|------|-----|-----------|
| 311 | 1·014 | 6·2 | 5·55 | ·35 | 1st Prize |
| 316 | 1·013 | 5·8 | 5·01 | ·58 | 2nd Prize |
| 313 | 1·013 | 6·4 | 5·42 | ·43 | 3rd Prize |

CLASS 503.—*One Dozen Bottles of Sweet Cider, made in 1911.*

| | | | | | |
|-----|-------|-----|------|-----|-----------|
| 319 | 1·030 | 3·3 | 8·60 | ·60 | 1st Prize |
| 330 | 1·031 | 4·0 | 9·10 | ·48 | 2nd Prize |
| 329 | 1·031 | 3·9 | 9·07 | ·42 | 3rd Prize |

CLASS 504.—*One Dozen Bottles of Cider, made previous to 1911.*

| | | | | | |
|-----|-------|-----|------|-----|-----------|
| 344 | 1·034 | 4·1 | 9·67 | ·40 | 1st Prize |
| 343 | 1·024 | 3·4 | 6·76 | ·38 | 2nd Prize |
| 346 | 1·031 | 3·6 | 7·50 | ·36 | 3rd Prize |

CLASS 505.—*One Dozen Bottles of Dry Perry.*

[No AWARD.]

CLASS 506.—*One Dozen Bottles of Sweet Perry.*

| | | | | | |
|-----|-------|-----|-------|-----|-----------|
| 353 | 1·022 | 5·2 | 7·51 | ·47 | 2nd Prize |
| 354 | 1·050 | 2·3 | 13·50 | ·90 | 3rd Prize |

Wool.—Taken as a whole the exhibit of wool was very good, but not so representative as might have been expected. Two of the exhibits, one in the Long Wool class and one in the Short Wool class were disqualified on account of being tied up with string in various places. Several samples were tender. In the Long Wool classes the Lincoln and Leicester were very good samples of that class of wool, and the same may be said of the Romney Marsh and Wensleydale which were well represented. In the Short Wool classes there was only one exhibit of Shropshire Wool, but it was very good. The Ryeland Wool was also well represented, all the entries being of good quality and sound usable wool. The Down Wools also were very good, sound and lofty. The Mountain and Moorland Wool was well represented, some of the exhibits being characteristic samples of high-class wool.

Hives and Honey.—The exhibits in this section suffered on account of the bad bee weather, which was responsible for a number of entries being cancelled. Under the circumstances the display was a very creditable one, and, with the exception of the opening day, this department was crowded with interested visitors.

Butter-making.—The competitors were fewer in number this year than on previous occasions, there being only twenty-eight competitors all told, which were divided into four sections, on the Tuesday and Wednesday, the greatest number competing at one time being seven. On the whole the candidates did very satisfactory work, though somewhat inexperienced, and all seemed to possess an average knowledge of modern methods of butter-making. The different competitions were keenly contested, the work was neatly and smartly done, and the competitors showed evidence of having received considerable training. The competition of the prize winners in the previous classes for the Championship numbered ten, and took place on Thursday. On the whole, the work was gone about in a tidy, methodical manner, and might be described as being up to an average degree of merit, with very few marks separating the highest and lowest. The work generally was neatly done, every attention being given to detail. The finished product was of good quality and attractively finished.

Horse-shoeing.—The work in these competitions was uniformly very good, the Roadster and Heavy classes especially so, the competitors being very keen, and giving the Judges a difficult task, in many cases, in their ultimate decision.

Horticulture.—The Horticultural section at Doncaster was one of the very best that the Society has held since Horticulture has been included in its annual shows. The exhibits as a whole, both in the plant and fruit classes, trade and competitive, were very good indeed and of good quality. In the Group classes the exhibits of Messrs. Cypher, Messrs. Blackmore & Langdon, Messrs. Harkness & Sons, and Messrs. Artindale & Son were very effective and beautifully arranged. The nurserymen and trade exhibits are worthy of special mention, as they were of exceptional merit; the roses were magnificent and of the finest individual blooms. The collection of herbaceous and hardy plants made a grand display, and included some novelties and others of recent introduction that attracted the notice of collectors of these popular plants. Vegetables were excellent in all classes, being clean and well grown. An improvement was noticeable on last year's exhibits, doubtless owing to a more favourable season of growth, and the staging and grouping quite satisfactory. The competitive class for Sweet Peas was not well filled, there

being only one exhibit, but this was excellent and well merited the 1st prize which was awarded. The non-competitive exhibits were in every way excellent and numerous, and were as good or even better than anything that had been seen this season. The Show, clashing as it did with the Royal Horticultural Society's Exhibition at Holland House, no doubt had much to do with the lack of entries in some of the competitive classes.

In concluding this report on the Doncaster Show, acknowledgment should be made of the services rendered in connection with the arrangements by the Local Honorary Secretary, Mr. R. A. H. Tovey (Town Clerk), and the Local Secretary, Mr. F. H. Chafer, whose father, the late Mr. George Chafer, occupied the same official position in connection with the previous Show in 1891.

It is a matter for general satisfaction that, notwithstanding the great difficulties the Society had to contend with at Doncaster, the result of the Show was not so bad as originally anticipated. This was, in some measure, due to the generosity of a number of exhibitors in the cattle, sheep and pig classes, who either gave the whole of their fees or made contributions towards meeting the Show expenses. The special fund so contributed amounted to 290*l.* 2*s.*, and a list of the donors is given below :—

Marquess of Crewe, K.G.,
 Earl of Coventry,
 Earl of Derby,
 Earl of Ellesmere,
 Earl of Feversham,
 Earl of Rosebery, K.G.,
 Lord Harlech,
 Lord Middleton,
 Lord Rothschild,
 Right Hon. Sir Ailwyn E. Fellowes,
 K.C.V.O.
 Sir Richard P. Cooper, Bart.,
 Sir Gilbert Greenall, Bart., C.V.O.,
 Lady Greenall,
 Sir Herbert Leon, Bart.,
 Sir Oswald Mosley, Bart.,
 Sir Peter C. Walker, Bart.,
 C. R. W. Adeane,
 Captain Clive Behrens,
 Frank Bibby,
 Alfred E. Blackwell,
 Albert Brassey,
 H. L. C. Brassey, M.P.,
 J. H. Bridges,

Alexander Cross,
 Lieut.-Col. Fergusson-Buchanan,
 John C. Forster,
 Kenneth Goschen,
 R. M. Greaves,
 Arthur Green,
 James Groves,
 Fred Hardy,
 R. Millington Knowles,
 C. Venables Llewelyn,
 W. Parkin Moore,
 Charles Morris,
 J. and R. Purvis,
 J. McClymont Reid,
 W. A. Sandeman,
 C. Tollemache Scott,
 Ernst Sehmer,
 R. Silcock & Sons,
 G. Murray Smith,
 Lady Smyth,
 R. J. Streatfeild,
 Mrs. Townshend,
 R. C. de Grey Vyner.

THOS. McROW.

16 Bedford Square,
 London, W.C.

MISCELLANEOUS IMPLEMENTS EXHIBITED AT DONCASTER, 1912.

THE entries this year for competition for the Society's Silver Medal show a falling off from last year both in number and interest, there being only forty-seven entries by thirty-one firms, as against fifty-four in 1911 and fifty-eight in 1910, and the Judges were only able to award two medals. This would point to a lull in the inventive activities of our agricultural implement manufacturers.

The following are the two awards that the Judges were able to make :—

| Catalogue No. | Exhibitor. | Nature of Implement. |
|---------------|--|---|
| 830 | Messrs. TREWHELLA BROS., 6 Alma Street, Soho, Birmingham. | Winch Grubber for pulling out trees and stumps. |
| 3461 | MR. ALFRED HOYLE, Don Foundry, Doncaster. | Dry Sprayer or Fungicide Distributor for Potatoes. |

No. 830, Stand 137.—*The Winch Grubber* exhibited by Messrs. Trehwella Bros., 6 Alma Street, Soho, Birmingham, is described as for pulling out trees and stumps, hauling logs, and general use by contractors. Price 26*l.* 10*s.*—This consists of a strong miniature winch worked by means of a long lever with a ratchet and pawl movement instead of the ordinary handle. There are a pair of small wheels fitted to the front part to enable it to be easily dragged about from tree to tree. There are two speeds, the quicker worked by a ratchet and pawl on the inside of the winding drum—this is used for hauling in the slack of the rope and so saving time. The slower speed is for the actual pulling up of the tree or stump, and is also actuated by a ratchet and pawl, but at a very low speed, the long handle being worked backwards and forwards, taking one tooth for the movement of the handle in either direction.

The ropes used are of wire and capable of withstanding a strain of from 20 to 30 tons. One end of the rope being fixed to the winch the other is passed round a standing tree or under the root of another stump in the ground. The anchorage must naturally be more solid than the tree to be uprooted. The rope is then passed round the pulley of a snatch block, the side of which opens in a very simple manner to avoid having to thread the rope through. The rope is then brought back to the winch and fastened to the drum. A wire rope is now fastened to the tree to be uprooted, either direct or to a sling that has already been passed round it, and the end is brought back to the snatch block where there is an ingenious clip round which the rope

is passed in a grooved channel, of sufficient diameter to avoid too sharp a bend, and then under a cam-shaped clip; the heavier the pull the tighter the grip. The hooks that are necessary for the rope-ends are attached thereto by unravelling the strands, passing them through a socket, and then inserting a wedge between them at the back side and driving home. This arrangement and the cam clip are of course not new, but during the trial the rope broke just at the wedge, and the joint was re-made in about five minutes, showing this to be a quite simple and practical fastening.

In case a stump is to be uprooted where there is no up-standing part of the tree, a triangle is used to lift the rope high enough to make the pull more in a vertical direction.

An oak stump of a tree some 15 in. diameter was operated upon, and in thirty-five minutes, including the stoppage on

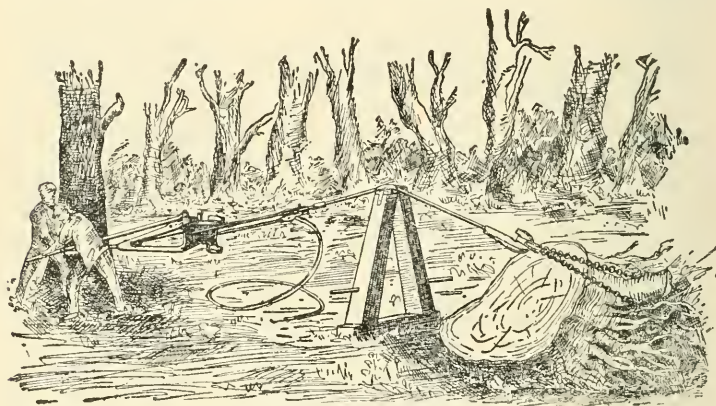


FIG. 1.—Winch Tree Grubber.

account of the breaking of the rope, it was pulled up and completely turned upside down, bringing with it a boll of earth about 9 ft. diameter.

Four men operated the whole thing; three of them working hard at the lever, but only at the time of heaviest pull when the roots were beginning to come out.

It is possible that the implement will be of most use in the Colonies where large tracts have to be cleared of timber.

No. 3461, Stand 286.—*Dry Sprayer or Fungicide Distributor for Potatoes.* Price 27l. 10s.—Exhibited by Mr. Alfred Hoyle, Don Foundry, Doncaster. This seems to be a successful attempt to produce a machine for distributing fungicide in a dry state, it having been found that in some cases this method of application is preferable to the wet process.

The machine is easily drawn by one horse, the driver being seated on a hopper containing the fungicide. One wheel of the machine drives a centrifugal fan or blower by means of a pitch chain counter-shaft and belt; the other wheel driving the feeding arrangement which is simply a pitch chain passing along the bottom of the hopper and out of a hole at the back, which hole has a movable plate to increase or diminish the opening. The speed of travel of the chain can also be varied by changing the sprocket on which it works. The fungicide is carried forward through the opening and drops into a scoop at the intake of the fan which delivers the air charged with

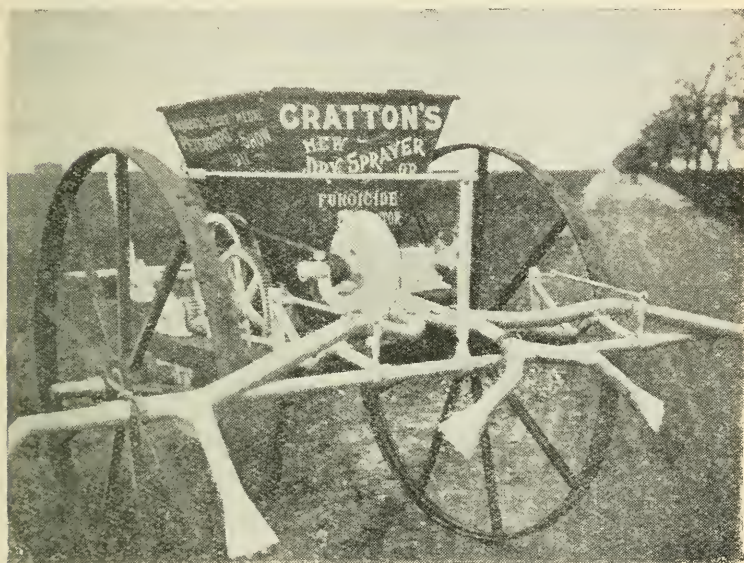


FIG. 2.—Dry Sprayer or Fungicide Distributor.

fungicide into flexible tubes at the back, the ends of which are easily adjusted to blow the dust under or over the leaves of the plants as the machine is drawn along. On coming to the end of a row the feed is cut off by a foot lever worked by the driver. The capacity of the machine is three rows at a time, that is, each side of the two central rows and one side of each of the outside rows. It is evident that the spraying should be done when the plants are damp. Fungicide being poisonous, the machine was tried with lime which, although it was rather damp, having been freshly slaked, seemed to be distributed evenly and with ease.

With reference to the other entries which were not awarded a medal, the following merit some notice :—

No. 1686, Stand 184.—*Combination Horse Collar and Hames*. Price 2*l.* complete.—Exhibited by Messrs. J. and H. Keyworth and Co., 35 Tarleton Street, Liverpool. This seems to be a successful attempt to enable a horse to pull his load with greater freedom to himself. The collar has the hames incorporated in it, this being hinged at the throat and clipped at the top, and opening enough to slip on. There is also an ingenious hook worked by a lever for instantly detaching the trace in case of the horse falling, and yet it is not at all likely to detach itself.

No. 1915, Stand 198.—*Expanding Horse Hoe*. Price 3*l.* 15*s.*—Exhibited by Messrs. George Brown & Son, Victoria Works, Leighton Buzzard. The carriers of the tines of this hoe are moved outward by pinions worked from the rear, each carrier having a rack engaging with a pinion on the top of one side and the bottom of the other, so that revolving the pinions one way extends the tines and the other way contracts them, their motion being parallel to each other. One set screw locks them all. The ends of the carriers are divided and renewable and changeable blades being slipped in between them are secured with a single bolt. The boxes in which the racks slide being bolted to each side of the frame of the tool make a very rigid job.

Potato Diggers.—There are the two following Potato Diggers working on different lines but which really have the same object in view, viz., to deliver the potatoes immediately behind the machine and as much as possible in a line, to enable the pickers to gather them up easily. It will be manifest that a good way to accomplish this is to screen the earth from the potatoes and then deposit them on the top of the ground, thus ensuring that there are none of them buried.

No. 3016, Stand 263.—Exhibited by the Agricultural Implement Company (Dundee), Ltd., 10 Reform Street, Dundee. Price 17*l.*—This machine does this by fitting just behind a horizontal share a revolving screen furnished with internal worms which take the earth containing the tubers from the share, and while conveying the same backwards and upwards, riddles the earth from the potatoes and delivers them in a good position for gathering (see Fig. 3).

No. 3568, Stand 290.—Exhibited by Messrs. H. Bushell & Sons, Railway Street, York. Price 16*l.* 10*s.*—This machine does the same thing by fitting three cages revolving one behind the other with their axes across the drills, thus riddling the soil and carrying the potatoes to the rear where they are deposited on the top of the already riddled soil.

The Judges regret that it was not possible to try these machines, as a comparison of the draught required by each, as well as a test of their actual capacity for doing the work claimed for them, would have been very instructive.

No. 3719, Stand 293.—*Conical Turnip Cutter*. Exhibited by Messrs. Blackstone & Co., Stamford. Price 4*l.* 10*s.*—The usual barrel, instead of being horizontal, works in a vertical position and is conical, it being driven by bevel gear. There are three sets of knives and three hoppers, which, however, cannot contain any large quantity of turnips. The last piece of the turnip is cut into strips by a knife fixed in the casing of the machine so that no flat pieces are delivered in the feed.

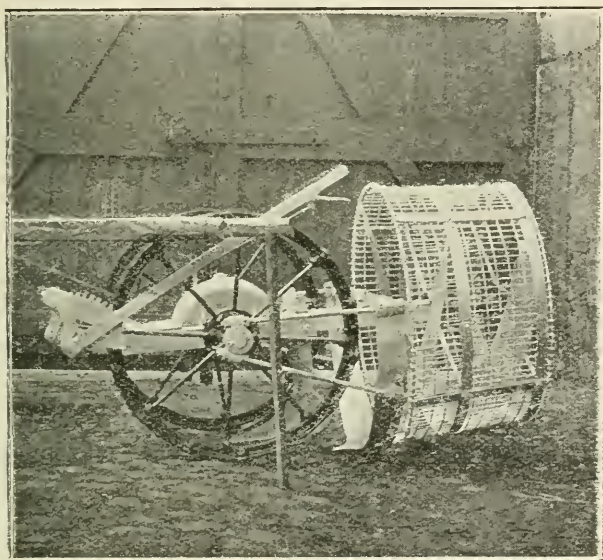


FIG. 3.—Potato Digger.

No. 3832, Stand 297.—*Chaffcutter Knife Sharpener*. Exhibited by Messrs. E. H. Bentall & Co., Heybridge, Maldon, Essex.—It will be known that the sharpening of chaffcutter knives is not a rapid nor easy operation. In this firm's chaffcutter, as shown, the fly-wheel carrying the knives can be cast loose by undoing a couple of nuts at the hub, the shaft then revolving without a wheel. To each of the arms carrying the knives a small lug with a hole bored in it is cast, into which is inserted the pivot of an arm carrying a small emery wheel which is driven by a round leather belt from the now freely revolving shaft. The emery wheel is tilted to the proper

angle for grinding the knife, the cutting-edge of which is struck with the radius of the arm from the pivot mentioned above. As soon as one knife is sharpened the arm is shifted to the next one.

The engines exhibited on this stand are fitted with a spark intensifier of an ingenious description. The magnetos are rotary instead of the ordinary ones that flick back to generate the spark. Instead of the connection between the 2 to 1 shaft and the magneto being solid the two are connected by a coiled spring, the action being as follows :—If at a point in the revolution of the shaft the magnet be stopped by a catch it will compress the spring, and on the release of the catch the spring causes the magneto to revolve quickly to make up for lost time and motion. This release is timed by a cam so as to produce the spark at the correct moment. As the engine gathers speed this cam causes the catch to dance about till by an extra high jump which is bound to occur sooner or later it hooks itself out of action. The resistance of the magneto is of itself not sufficient to have any effect upon the spring, and the whole now revolves as if it was a solid connection.

No. 4401, Stand 347. *Steaming and Molasses Mixer*. Price 47*l.* 15*s.*—Exhibited by Mr. Chas. L. De Wilde Reader, Hursley, near Winchester. This machine possibly owes its inception to the shortness of the root crop in some districts last year when the mixture of molasses with chaff proved so useful. The chaff is fed into a hopper in which are two spiked rollers which distribute it evenly so as to pass it down in a flat vertical stream past the mouths of two steam molasses injectors, one on each side. These injectors are fed with molasses and steam under control by valves, the one pipe inside the other, so that the molasses is kept up to boiling point, till they arrive together at the mouths of the injectors where they are sprayed in a fan shape on to the stream of falling chaff. The treated material then falls on to a band conveyor which delivers it on to the floor ready for use.

No. 4570, Stand 365.—“*Compactum*” *Roller Mill Plant*. Price 425*l.*—Exhibited by Messrs. Samuelson & Co., Banbury. This is a very compact plant of complete roller mill, with wheat separator, suitable for the Colonies. Special attention has been given to making it quite independent of the buildings containing it so that it may be erected and covered with a corrugated iron building. The capacity is naturally small.

This exhausts the notice your Judges think should be published in the Journal of the Implements entered for the Silver Medal.

It is interesting to note the continuance of the tendency, as mentioned in last year's Journal, of makers to turn their

attention to small power engines using either petrol or paraffin. A noticeable feature of these engines this year is the placing of the cylinder inside a water box as it were, instead of using the

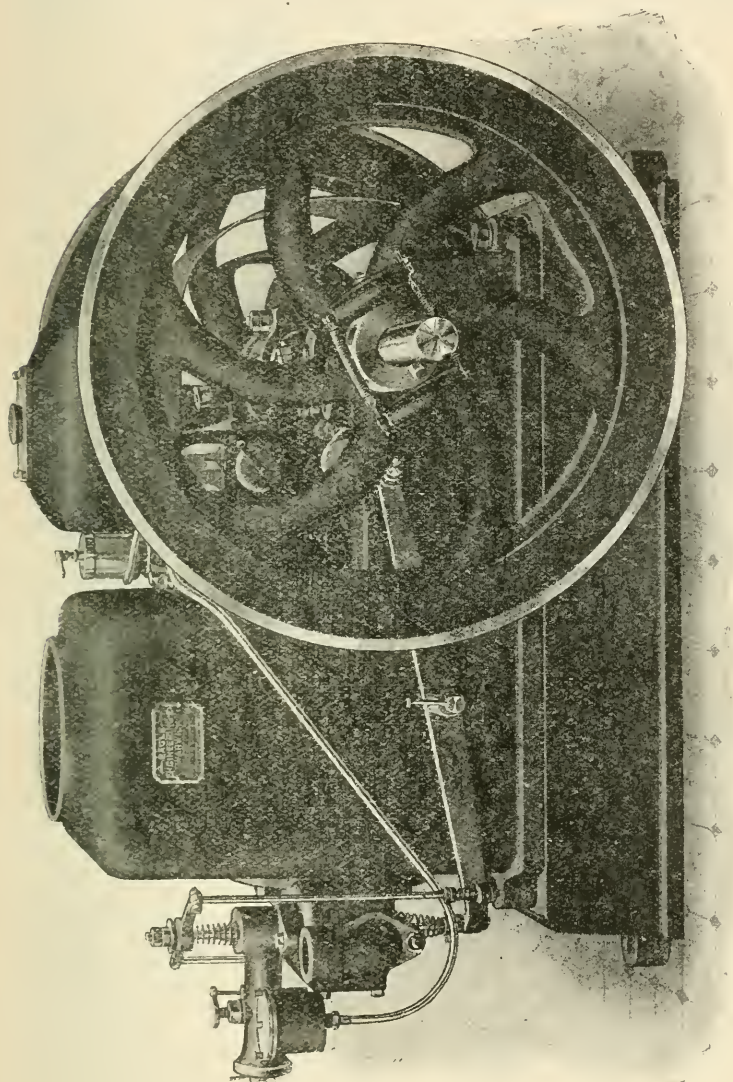


FIG. 4.—Petrol Engine.

usual water jacket and separate tank for cooling. This is a system to be commended. Nothing could be simpler both to

manufacture and to maintain in use. The temperature of the cylinder quickly attains that of boiling water, and it is a well known fact that this class of engine works to most advantage when fairly hot. There is also less chance of freezing of pipes in winter. A good example of these engines was seen at Stand 339, The Eagle Engineering Company, Warwick.

Some other engines were noticed with a water cooling arrangement consisting of a cone of wire gauze on to the apex of which the water was pumped after passing through the jacket; the gauze exposing a large surface to the air while the water trickled over it. This arrangement is not nearly so simple as the one mentioned above, nor in any degree more efficient. It is possible that the "American Invasion," so prominent on Stand 346 of the Associated Manufacturers' Co., London, N.W., is responsible for this innovation. The engines displayed on this Stand are remarkably cheap, ranging from 16*l.* 4*s.* 6*d.* for 2½ H.P. to 38*l.* for 6 H.P., but as regard finish and design our makers have no need to fear comparison.

One looks in vain for a great extension of the Diesel or Semi-Diesel system from the engines shown last year. There are a few such engines which claim to work with heavy crude oil. It is well to bear in mind that Semi-Diesel is somewhat of a misnomer. Dr. Diesel's system works with a very high compression necessitating extremely accurate and sound workmanship, the cost of which militates against its employment for purely agricultural work. An air compressor also is necessary for compressing the air to start the engine and inject the oil in the form of a spray. The cycle of the Diesel engine is as follows:—The shaft having been turned till the piston is just commencing its working stroke, air, previously compressed by a compressor attached to the engine itself, to some 500 lb. a square inch, is admitted, giving an impulse and starting the engine. On the compression stroke the air enclosed in the cylinder is heated to a high temperature, and at the top of the stroke the oil is sprayed into the cylinder by means of compressed air, and burns, being ignited by the hot air itself. In the so-called Semi-Diesel the compression does not usually go above 120 to 150 lb., and the oil alone is squirted into a bulb at the head of the cylinder previously heated by a lamp but which afterwards is kept hot by the subsequent explosions.

It will thus be seen that it is unlikely the Diesel proper will come into general use for agricultural purposes owing to higher cost and greater complication. The Semi-Diesel must always suffer from the necessity of having to heat the bulb with a lamp or of starting on petrol with electric ignition.

A good example of a simple engine is seen on Stand 304, Messrs. Robey & Co., driving a dynamo. It is of a vertical two

stroke type without any valves in the cylinder, the piston forming its own valve by uncovering exhausts and inlet ports, the incoming scavenging charge of air having been compressed in the crank chamber. The oil injection pump is worked by an eccentric with a variable throw controlled by a shaft governor.

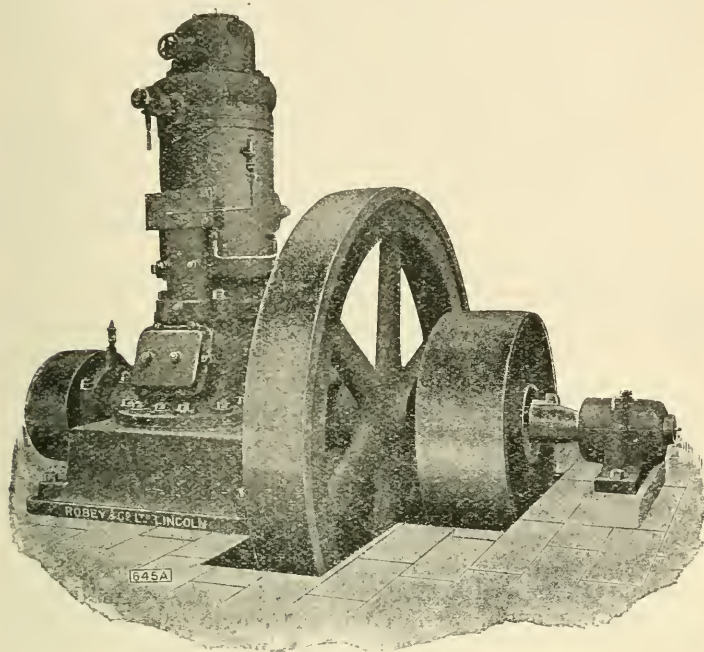


FIG. 5.—Crude Oil Engine.

As regards tractors for ploughs and purely agricultural use, as apart from light road tractors, it would appear as if the evolution of this machine is not yet sufficiently advanced to be able to say the type and form the tractor will eventually take. It is possible that when it is more standardised the Society may see their way to have competitive trials.

In the Ideal Agricultural Motor, Stand 311, there is fitted an arrangement whereby either driving wheel may be locked while the opposite one revolves, thus turning the machine on its own axis, which should be useful in ploughing. Both wheels can also be locked so as to revolve together when they tend to slip. The spuds on the wheels extend through the rim to the hub where their ends work against a roller path which can be raised or lowered from the footplate, thus forcing them into the ground when required.

Messrs. John Fowler & Co., Leeds, exhibit an Internal Combustion Tractor which closely resembles an ordinary steamer. The engine is horizontal, placed on the top of the boiler, and the gear for driving the road wheels and also the winding drum is placed in what corresponds to the fire box. It is possible that the attempt to make a machine driven by an internal combustion engine exactly on the same lines as the well-tried steam engine type is correct, but there is no doubt a too slavish copy would not be advantageous.

A parallel instance may be cited as regards the Diesel engine for marine work, that the main outline of the well-tried ordinary steam marine engine with its side levers, &c., &c., should be retained. The truth probably lies as usual between the two extremes, and one may look for development of an individual type of motor tractor.

Several makers are attempting to effect economy by using superheated steam. Messrs. Richard Garrett & Sons, Stand 252, show a traction engine with super heater. The smoke box, looked at from the front, is U shaped. The bed of the super heater forms the base of the chimney and the tubes project into the smoke box, the whole closing in the top of the U would appear to be fairly accessible.

It will be interesting to see whether in practical use the gain is sufficient to warrant the extra cost and complication of this and other superheaters in view of the fact that tube cleaning must of necessity be rendered more difficult.

The Daimler Stand 253 is rendered conspicuous by an enormous tractor of 105 H.P., suitable it is stated for drawing a 21 furrow plough. The engine is 6-cylinder of the usual sleeve type and has to have a small single cylinder engine to start it.

An agricultural tractor and chassis with a well-designed back axle are also shown.

Messrs. Barford and Perkins, Stand 280, show a number of road rollers. No. 3217 would seem to be a somewhat new departure on the principle of "a stitch in time" for road-mending. It carries its own supply of water for sprinkling and a certain amount of road material so that it can be taken along a road and a few stones put down, watered, and rolled in wherever an incipient pot hole is found—the same process of mending as is so largely carried out on the best French roads where a hole is filled in at once with a handful of stones which are consolidated with a hand rammer.

Several Suction Gas Plants are shown. No. 3192. Messrs. Ruston, Proctor, & Co., is a producer which is fed with refuse pieces of wood and sawdust from a sawmill. The fuel hopper has not the usual slide at the bottom, which obviously could not be

forced through a pile of wood and sawdust, but is made much longer and kept continuously full, there being no chance of weakening the gas by drawing in air while filling up with fuel. The gas is drawn off by two pipes instead of one; these have movable scrapers nearly fitting the inside of the pipe, so that while one is being used to scrape the pipe free from dust and tar the gas flows down the other. These pipes deliver into the usual water scrubber which opens at the bottom into a water-sealed hopper with a large mouth to enable a shovel to enter in order to remove dust and ash. The gas is afterwards passed through a centrifugal tar extractor, driven in this case by an electric motor; in practice, no doubt, it would be driven by the engine direct. It is interesting to note that no water is required under the grate, the moisture in the wood and sawdust being sufficient.

The tendency of governing suction gas engines seems to be towards the use of the throttle instead of the "hit and miss" arrangement, as being more calculated to keep the fire nicely burning so that a sudden demand for gas may more readily be met by the producer.

At Stand 386, the Associated Portland Cement Co. have an attractive exhibit showing the use of concrete as adapted to farm and estate use. This Company's stand was very fully noticed in last year's report, but new uses of concrete are continually being found. The writer now makes his cottage windows, two mullions and three lights, the centre one to open, cast in one piece with sill and head. The glass is set in a rebate formed in the casement without any other frame, and the casement which opens is itself made of cement, the hinges being cast in place, so that there is no fitting, no painting, and no woodwork to rot; the whole being cheaper than when made of oak.

I have to thank my fellow judge, Mr. J. B. Ellis; the Stewards of Implements, Mr. F. S. W. Cornwallis and the Hon. J. E. Cross; and the Society's engineer, Mr. F. S. Courtney, for the great help given by them in getting through the business of the judging of the new implements.

HARRY W. BUDDICOM.

Penbedw,
Mold.

AGRICULTURAL EDUCATION EXHIBITION, DONCASTER, 1912.

THE Education Exhibition was once more under the direction of Sir J. B. Bowen-Jones, Bart., and was for the most part housed in one building adjoining the Forestry exhibits as in previous years. A departure was, however, made at Doncaster, in that the exhibits of the University of Leeds and the Yorkshire Council for Agricultural Education were to be found in a special pavilion separated from the main building. As in 1911, the Agricultural Colleges were less numerously represented than in some previous years, but this would be explained by the fact that the locality of the Show chanced to be somewhat remote from many of the teaching and experimental institutions. The general public, however, manifested a very keen interest in this section of the Show, and apart from the passing curiosity aroused by the various exhibits in the minds of the holiday-makers, it was gratifying to note that the exhibition is regarded not merely as an occasion for "window-dressing" but as an opportunity by which the teacher of agricultural science and the investigator of agricultural problems can get closely into touch with the rank and file of practical farmers. The advantage to both parties from these informal meetings and discussions will be obvious to all.

Of late years it has been increasingly noticeable that the visitors to the Education Exhibition include an entirely new class in the persons of the elementary school teachers, and their scholars. In proportion as the College exhibits have become fewer, so have those from the elementary schools increased, and at Doncaster a large part of the building was given up to the Nature Study and Rural Education Exhibition organised by the County Councils Association. The various exhibits took an extraordinary range and need not be particularised here, but although the problem of the retention of the labourer on the land is much more than a mere question of education, it is obvious that the introduction of hand and eye training into the school curriculum marks a distinct advance in educational methods.

The Royal Agricultural Society of England. Woburn Experimental Station. The closing of the Cattle Classes at the Doncaster Show drew more attention to the other departments of the exhibition, and caused a larger number of visitors to come to the Agricultural Education tent. Mr. H. M. Freear was, as usual, in attendance throughout.

The new matter shown consisted principally of exhibits illustrating (1) the effect of heating soil, (2) the influence of lime on natural and heated soils, (3) the heating of acid soil,

(4) the use of inoculating material for leguminous plants, (5) the effect of growing deep-rooting plants and grasses for the eradication of wild onion.

1. *Heating of soil*.—The soil used was the light sandy loam of the Woburn farm, one pot containing the natural soil and another the same soil after heating it to 100°C. Sweet peas were grown in each pot, but there was no evidence, in the relative growth, of any beneficial result from the heating. Former experiments with wheat on this same soil, however, have shown benefit to accrue from the heating, and it may be, therefore, that the nature of the crop constitutes an important factor in the case.

2. *Influence of lime on natural and heated soils*.—The soil here used was black land from the Cambridgeshire fens. On this a barley crop will not grow well, and, even when lime is added, little benefit is seen. But it was found (and here shown) that if the soil be heated to 80°C. and then lime applied, there is a most marked benefit.

3. *Heating of acid soil*.—The soil of plot 2b of the continuous barley experiments (which had been rendered acid through the long use of sulphate of ammonia) was subjected to heating, to see if this benefited the soil. But the result was shown not to be satisfactory, the barley crop not being even as good as on the acid soil without heating, and affording a great contrast to the marked benefit produced by the use of lime. The weed growth (mainly spurry) was, however, quite checked by the heating.

4. *Inoculation of leguminous crops*.—The crop tried was beans. In one pot beans were sown in the ordinary way, and in another the beans were steeped in a new American preparation for inoculation purposes before being planted. As the plants grew, there seemed to be some slight benefit from the inoculation. Subsequent weighing of the crop confirmed this, there being more pods and also beans from the treated seed, though the total weight was only slightly increased. There was, however, considerably more straw where inoculation took place.

5. *Eradication of Wild Onion*.—This exhibit, perhaps more than any other, attracted attention. It consisted of soil from two plots on a field at Chelsing, Ware, on which wheat was growing. In one case the soil had been left cultivated in the ordinary way, and here wild onion was very prominent and the plants growing vigorously. In the other the land had been laid down four years previously with a mixture of deep-rooting grasses and plants (Elliot's mixture), then ploughed up and wheat sown. Here there were only one or two wild onion plants left and these very attenuated in growth. The soil too

was quite altered in texture, being rendered much more open and porous.

The exhibit embraced the continuation of previous work, including illustration of the effect of magnesia on the wheat plant, and of the effect on root growth of (a) heating soil, (b) acidity, (c) the addition of lime and of magnesia.

In addition there were the usual exhibits of plans and photographs of the farm and of special plots, and of the collected results set out in tabular form.

The Botanical Department of the Society was responsible for a valuable exhibit which included cultures showing the effect of artificial manures on the extent to which wheat suffers from rust and mildew. Specimens of Professor Biffen's new varieties of wheat and barley were also exhibited.

The Midland Agricultural and Dairy College, Kingston, Derby.—The exhibits from this institution included a fine collection of cheeses of all sorts, made at the College—Cheddar, Derby, Leicester, Cheshire, Caerphilly, and some of the continental soft cheeses. Perhaps the most interesting feature of the stall was that dealing with the manuring of grass-land for milk. These experiments have been carried on now for some years, and although the dressing of lime, superphosphate, and sulphate of potash recommended is very expensive, the effect on the milk-yield is little short of extraordinary. Other exhibits included cultures of various organisms, both useful and injurious in the dairy; the composition of milling offals and their adulterants; and diagrams and photographs illustrative of experimental work in several other directions.

The College of Agriculture and Horticulture, Holmes Chapel, Cheshire.—An interesting series of specimens showing wart disease (black scab) in potatoes was shown by this College, with trays showing the distribution of varieties of potatoes said to be immune. An insect pest which has been the cause of serious losses in the oat crop, the frit fly, was exhibited, with examples of damaged plants. This pest has been very prevalent in many districts during the past year or two, and the damage done by it is not infrequently confused with that due to eelworm. Plots of turf, showing the effect of different manures, were exhibited, and also a series of veterinary specimens illustrative of the diseases of farm stock.

The University of Leeds and the Yorkshire Council for Agricultural Education.—This exhibit, which occupied a separate pavilion at some little distance from the other Agricultural Education exhibits, may not unfairly be described as the most important both in point of view of size and also of scope. Specimens were shown covering the whole range of the agricultural work of the University, and they aroused very considerable interest

amongst the visitors. A noticeable feature was the case containing materials taken from the crops of many species of birds, and the quantity and the variety of the food of the wood-pigeon was particularly striking. The zoological section also included exhibits illustrative of the life histories of insects injurious to farm and garden crops. The recent discoveries as to the effect on the growth of crops produced by first heating the soil, were well illustrated, and many diagrams showing the results of field experiments throughout Yorkshire, the manurial value of foods, the composition and value of hay made from grass cut at different times, &c., were exhibited. A large series of turf samples illustrated the effect of various manures. In the dairying section were shown examples of dairy produce made by the students, including cheeses, butter, and clotted cream, and amongst the more popular exhibits were bottled fruits, home-made wines, examples of blacksmiths' work, and so on. Daily demonstrations were given of poultry trussing and fruit bottling.

The Agricultural Education Association was represented, as in previous years, by a stand containing copies of prospectuses and reports from the various Agricultural Colleges throughout the kingdom.

Exhibit of Home-grown Tobacco.—A new feature in this section of the Show was Major G. F. Whitmore's exhibit of tobacco grown by him at Methwold, in Norfolk. Every stage of growth and production was shown, from the seed of the tobacco plant to the finished article. In view of the proposals for the growth of tobacco in this country, it might be of interest to record here the existing relaxations of restrictions upon tobacco-growing in England and Wales under the Finance (1909-10) Act, 1910. This Act makes provision to permit the growth of tobacco subject to licence from H.M. Commissioners of Customs and Excise. Further, under the provisions of this Act, rebate of one-third of the existing duty of 3s. 6d. per lb. is allowable to growers upon a total of 100 acres for the years 1911, 1912, and 1913, subject to the approval of the Board of Agriculture and H.M. Commissioners of Customs and Excise. To growers under this allowance of rebate, a further concession has been made by H.M. Commissioners in waiving the licence fee, and also the bond which the grower is required to enter into according to the letter of the regulations framed to meet the provisions of the Act.

The British Tobacco Growers Society has made an application to H.M. Treasury for a grant in aid of its work from the Development Fund, and their application is now under consideration.

FORESTRY EXHIBITION AT DONCASTER, 1912.

THE Forestry Exhibition at Doncaster consisted of 113 entries, and although not containing, perhaps, as many entries as were shown at Norwich, by the interesting character of the exhibitions and the improved and excellent staging, it quite maintained the high-class character for which these shows are now attaining a well-deserved reputation. In fact, a very great improvement was noticed in that the exhibits were better shown and more readily seen than last year, and the whole effect was distinctly good. The new arrangement of the buildings, which were so placed that they connected directly with the space set aside for Agricultural Instruction by a covered verandah, in which planks and other heavy exhibits could be shown without undue crowding, was an improvement which the stewards obtained from the Council of the Royal Agricultural Society, and the alteration entailed was fully justified, as it gave the exhibits of rare trees and shrubs a most welcome shelter in the form of an enclosure on three sides, helping very largely to show them off and to give a finishing touch to the whole Forestry exhibit. Mr. George Marshall and Mr. C. Coltman Rogers, the two stewards, are to be congratulated upon the marked improvement in the structural arrangement and staging generally.

One noticed especially the outside exhibits by Messrs. Dickson, Fisher Son & Sibray, and Kent & Brydon, which did much to beautify the Forestry section. The exhibition of trees, including a great many of considerable rarity, was of the greatest educational interest. These three exhibits attracted a good deal of attention, and it was noticed that there were always several visitors specially interested in identifying the specimens, which were all fully and clearly named. Messrs. Dickson's exhibit was entered in Class 13, and awarded a silver medal for the best exhibit of specimen and ornamental trees.

The planks exhibited in the first four competitive classes were not so numerous as last year. Amongst these, however, special notice may be made of a good specimen of oak, which was shown by Sir John W. Ramsden, Bart., and one fine larch plank by the Earl of Feversham. An exceptionally fine exhibit by P. T. Davies Cooke, Esq., in Class 20 was awarded a silver medal, in which the unusual planks of mulberry, catalpa, apricot, and almond were found, with a very fine plank of

Quercus Coccinea. It should be mentioned here that, although the planks for competition were not numerous, those shown in the exhibition classes were in great variety and numbers.

The gates were good all through, and difficult to place, but it was noticed that in some instances the exhibitors had failed to take into consideration that one of the chief points was economy. The wood used was of good quality generally, but in some cases knotty and showing more sap wood than should be seen. Also it would be advisable to point out here that where bolts are used care should be taken to cut off the ends to prevent them standing out foul. The prices given were a great help. In Class 5, for an Oak Field Gate for Farm Use, the first prize was won by Mr. Charles Thellusson, and the second by Lord Fitzwilliam. It should always be borne in mind by exhibitors that a gate for farm use is for general field use, and cannot include a gate which is more suitable for an entrance gate to the farmhouse than for general purposes. In Class 6, for a Field Gate of any other Home-grown Wood, Sir Tatton Sykes and Lord Carnarvon won first and second prizes respectively. In this class the quality of the wood used very largely influenced the award. In Class 7, for a Wicket or Hunting Gate, the first prize went to Sir Tatton Sykes for a very cheap strong gate of good wood and well put together. In judging these three classes the points of special interest appeared to be the cost, the quality of the wood, degree of excellence in the ironwork, and most of all the workmanship, such as carefulness and pains shown in the mortising and general construction, indicating that thought had been expended in the endeavour to avoid weakness at any point, general rigidity, and avoidance as far as possible of places where wet might enter and cause decay.

Mr. Charles Thellusson's Tree Guard fully deserved its silver medal, conforming so well to the requirements of the class by being made to open. It was at the same time the most practical exhibit in the class. The rails, also, are fitted close enough to prevent stock putting their heads through the bars, which is an important consideration.

In Class 9, for Fencing of Home-grown Wood, Lord Yarborough's creosoted fencing won the first prize, but one might here emphasise the difficulty of judging such very different descriptions of fencing in one class as chestnut, pale, and creosoted fencing. Perhaps some method can be devised to divide the classes better another year.

The fencing shown by Messrs. Armstrong, Addison & Co. and Messrs. English Bros. was a most useful exhibit, especially as the cost was clearly stated, so that all the different classes of fencing could be compared.

In Class 12, for Specimens of Stems and Boards, showing the effect of dense and thin crops, Lord Yarborough's exhibit won the silver medal. It afforded the best education possible, and showed most clearly the enormous advantage of dense planting. The whole object of the Forestry Exhibition is educational, and such exhibits as that mentioned above cannot be too highly praised, as it was evident to any one glancing at it that the old and bad order of forestry, when trees were planted 6, 7, and 8 ft. apart, and then thinned out constantly, could result only in ruination of the timber for commercial purposes, and as to the financial result could lead but direct to bankruptcy. In perhaps a lesser degree, but just as forcibly, the same point is repeated over and over again throughout the Show, both as to branch suppression and the effects of good and bad pruning. So many of the woods on the smaller estates are in the immediate control of woodmen, who, although they carry out their duties conscientiously and well, cannot be expected to know how important pruning and close planting are. Their want of knowledge can be most easily and quickly remedied by their attendance at the Forestry Exhibitions of the Royal Agricultural Society, and it is to be hoped that all owners of woodlands will endeavour to arrange for their woodmen to visit whenever possible these Shows, as it is certain that the benefit derived will very soon make itself apparent in the improved methods of silviculture on their estates.

The Duke of Northumberland's exhibit of the life history of Scots fir wood proved to be so realistic that one could hardly believe that the trees had not always grown on the Showground, and very great credit is due to Mr. Gillanders for this marvellously lifelike representation. Especially interesting were the specimens showing the effects of good and bad methods of pruning, object lessons which all should take to heart.

Messrs. Flatter & Co.'s exhibition of microscopical structure of forest trees and plants must also be mentioned. The hand-painted slides were exquisitely worked.

Lord Yarborough's large exhibition was so full of interest that it would require many hours to explore. The time and patient hard work which Mr. Havelock must have given to it alone deserved a medal, and the extraordinary diversity of the different groups fully justified the award of the gold medal.

The collection of burrs and witches brooms was unique. It was difficult to realise how a collection of 178 hand specimens could be accumulated from one estate.

The planks and round wood ripped, showing the effect of creosoting, and also the fencing, treated and untreated, made

one realise the great importance to landowners of using creosote to save the cost of upkeep on estates where wood fences are a constant source of expenditure. Shown side by side were larch posts untreated after eleven years' use, rotten where they entered the soil from the action of air and water, and evidently requiring immediate renewal, as against creosoted spruce and other woods which had been in the ground for from fifteen to seventeen years, and were as good as when they were put down. The latter showed no sign of decay, with their edges as sharp as when they came from the saw, and all the saw marks on them still. The extra cost of creosoting was thus repaid over and over again.

Mention must also be made of the Duke of Wellington's exhibit, which was very extensive and of great interest. The specimen seedling trees were most carefully staged, and the effect of close planting in young coverts, shown by specimens of small trees taken from plantations where the plants stood 3 ft., 3 ft. 6 in., and 4 ft. apart, was most clearly demonstrated to be that of the complete suppression of branches.

A very extensive collection of seeds and cones, with hand specimens of various woods, made up a most attractive staging, and showed that great care and trouble had been taken.

In conclusion, the Judges wish to thank the two stewards for their courteous assistance, and also to congratulate them on the excellence of the Show, as they feel convinced that a more interesting and instructive exhibition it would be difficult to get together. When one realises the time and trouble that such collections mean to those who have made them, and the still greater trouble, to say nothing of the cost, that is required to pack and stage them, one really wonders how it is that the Royal Agricultural Society contrived to get them together at all, and not only to get them together, but to vary this interesting entertainment every year. So far, however, it has been accomplished, and those interested in Forestry can but feel very grateful to all concerned for their assistance on such occasions, and the Judges wish to express that gratitude here most cordially.

J. C. BLOFELD.

Hoveton House,
Norfolk.

REPORT OF JUDGES ON PLANTATIONS AND HOME NURSERIES COMPETITION, 1912.

IN order that competitors and others should, while interest was still keen, be placed in possession of detailed information with regard to the points that led the Judges to arrive at their decisions, permission was given to publish a Report in the July issue of the Quarterly Journal of Forestry. In that Report the various classes were taken up seriatim, and the character of the exhibits was discussed in detail. It would seem undesirable that the same formal treatment should be adopted for the present purpose, it being considered more useful to call attention to the outstanding features of Yorkshire forestry as brought to the Judges' notice on the occasion of their inspection in the month of June. In another part of this issue (pages lxxxvi and lxxxvii) a record of the awards will be found.

During our examination of the woods presented for our inspection we were occasionally impressed with the comparatively successful results that were being obtained under unfavourable conditions, such as high altitude, severe exposure, or unfavourable soil. At first we were inclined to think that in making the awards we should take these considerations into account, that is to say, it at first sight appeared to be not unreasonable to put an intrinsically inferior exhibit before another in the prize list, when the former was comparatively successful in the face of serious obstacles, even if the latter was showing a greater volume and value of timber attained in a given time. A man might be deserving of much more credit in attaining moderate success in the face of unusual difficulties than another man who had obtained a larger measure of success with everything in his favour. But if we ever seriously contemplated giving effect to this idea we abandoned it at an early stage, having in mind the method followed in awarding the prizes of the Society for live stock. When a number of animals are placed before the Judges the latter take no account of the ownership or origin of the animals. It may be that some of the animals belong to small tenant farmers who have obtained creditable results in face of insufficient capital, unsatisfactory buildings, an inclement climate, or poor land; whereas other animals may be owned by men who have been able to command every factor making for success. But the Judges take account only of the merit of the individual animals submitted, and pay no attention to the circumstances under which they have been produced. Following this line also we have judged the plantations without regard to extraneous circumstances.

Seeds and Nursery Work.—In recent years a considerable amount of scientific work has been done in various parts of the world, with the view of proving what has long been suspected, that within the limits of any particular species of tree there may be many varieties of strains. Such varieties may be distinguished from each other by morphological characters, such as the shape and length of the leaves, the arrangement of the branches, and the straightness of the stem; or the distinction may be physiological, taking the form of more rapid growth, greater resistance to disease, and greater vigour. No sharp line exists between these two types of varieties, but it is convenient to class them in this way. In illustration one may take the Scots pine (*Pinus silvestris*), a species widely distributed throughout Europe and Asia. Seed of this species has been collected at different altitudes and in different latitudes, and from trees of robust growth with fine stems, as well as from comparatively dwarfed individuals with twisted and knotty boles: and it has been found that when such seed is sowed in contiguous beds at any particular centre the resultant seedlings differ greatly in character. At the end of, say, ten years certain batches of seedlings may show perfectly satisfactory growth and have attained to a height of perhaps 15 to 20 feet, while other lots of seedlings may have remained stunted and misshapen, and be no more than a few feet in height, holding out no promise of ever forming satisfactory stems. In some cases it may even be found that the seedlings have been unable to survive at all, all having been cleared off by disease, or some other influence, in their earliest years. Enough work has not been done to enable British landowners and foresters to come to a decision with regard to the best place from which to obtain supplies of seed, whether of the Scots pine or of any other species; but the more the matter is looked into the more does its importance impress intelligent planters. We had an excellent example of this condition of things in the case of six-year-old larches, growing on the estate of Ainsty. These larches had been obtained from two different sources, and whereas the one lot were growing vigorously and proving in every respect perfectly satisfactory, the other lot, of the same age and growing alongside, consisted of comparatively dwarfed individuals which gave little promise of yielding satisfactory results.

Another consideration that should receive careful attention in connection with nursery work is the selection of a site that is not specially liable to spring frosts. The month of May preceding our inspection contained several nights when the thermometer fell below the freezing point, and the results were only too obvious, not only in nurseries but throughout young

plantations generally. The situation most liable to spring frosts is a damp hollow, and in selecting a site for a nursery an open breezy situation should be selected. Of course, something can be done to protect nursery stock against frost, apart altogether from the influence of the situation. The seed beds are often sheltered by boughs, matting, or screens, while plant beds can receive considerable protection from rows of hardwood standards, 4 to 8 feet in height, that are being specially reared for avenue, park, and hedgerow purposes.

If a nursery is too large to have its seed beds protected in the foregoing manner, or standard trees are not required in such abundance, a good plan is to plant rows of Lombardy poplar at intervals on the north and west sides of the seed flats, and after these poplars have grown to the desired height for secure protection of the seedlings against frost, they can be "topped" every two years to keep them in check. The sides also can be readily trimmed, and as they are of conical growth they do not spread their branches unduly over the adjoining ground.

Another point that requires emphasising in regard to nursery treatment is the desirability of fully utilising the ground, and this is secured by seeing that the plants stand sufficiently close together in the beds. In one nursery that we visited the rows, and the interspacing between the plants in the rows, were so wide that the young trees hardly touched each other, and although strong, bushy plants were being produced in this way, the output was probably well under one-half of what the nursery was capable of furnishing. We are well aware that an equally serious mistake can be made by overcrowding the nursery beds, but those in charge of a nursery should attempt to strike the happy mean between the two extremes.

It is unnecessary to dwell upon the importance of keeping down weeds and, by frequent hoeing, preserving a fine tilth or "crumb" on the surface, as these matters are generally well understood and given effect to.

In connection with the planting of outlying areas, it is well worth the attention of foresters to give consideration to the establishment of a temporary nursery for the supply of the requisite plants. If the area contains a piece of ground which can be ploughed, or, in some other way, easily brought into a condition to serve for the lining out of one-year-old seedlings, considerable expense will later be saved in the matter of carriage and carting. Moreover, greater success will attend the transference of plants from a nursery close to the area to be planted than will be the case where the trees have to be brought by rail or even carted for some miles. When the trees are lifted

from such a temporary nursery a sufficient number should be left properly interspaced to grow up to form part of the permanent crop.

Nursing and Management of Hardwoods.—In all cases brought to our notice where the intention was to produce a final crop of hardwoods, these had been introduced at comparatively wide intervals, the rest of the ground having been filled up with conifer nurses. The object of so doing is mainly a dual one, namely to save expense in the first instance, and at an early date to obtain some return in the form of useful thinnings. An idea also prevails that if the nurses are more quick growing than the permanent crop, the latter will be forced up by the nursing species, but it is doubtful whether there is much in this contention. Admitting that it is in many cases desirable to introduce conifers as nurses for hardwoods, it was evident that the nurses frequently consisted of too many species. In the majority of cases such nurses consisted of larch, Scots pine, and spruce, and of these the larch would appear to be much the most suitable, for not only are the plants obtainable at a reasonable price, but no species gives a higher return in the form of thinnings. Moreover, the larch is a tree, producing as it does comparatively small branches, which is not unduly aggressive, while its rapid growth in youth secures the advantage of shelter for the species with which it is mixed. The Scots pine, on the other hand, produces wide-spreading branches, which are apt to do much damage to less vigorous hardwoods with which it may be associated. The earlier thinnings, too, of Scots pine are of comparatively little value. Spruce makes a better nurse in some respects than Scots pine, partly because it is not so assertive in youth, and consequently does not, to the same extent, encroach on neighbouring species, and partly because it can grow fairly well under the shade of other trees. But spruce thinnings, though perhaps more serviceable than those of the Scots pine, are of much less value than larch poles. It would appear, therefore, that where hardwoods are to be nursed with conifers the larch, alone or mixed with a thin sprinkling of spruce, should be depended on to secure the objects in view. We have, at a later point, something to say on the comparative merits of the European and Japanese larches.

The general method of establishing hardwood plantations in Yorkshire would appear to be to set out oaks, beeches, ashes, or whatever the species selected, at about 12 ft. intervals; that is to say, with lines 4 ft. apart, the hardwoods would form every third plant in every third row, the rest of the ground being occupied by the nursing conifers. The intention of such an arrangement is that, when the conifers have all been

removed in the thinnings, the hardwoods shall completely occupy the ground at 12 ft. intervals. In our opinion, however, this system of management leaves much to be desired. If one looks over an area of ground planted entirely with one species, one will have no difficulty in seeing that within a few years a certain proportion of the trees have grown much more vigorously than the others, and it is these vigorous individuals which, in a pure wood, one would retain to form the later thinnings and final crop. In other words, in a pure wood one has abundant opportunity for selecting strong plants which can be retained, and of rejecting—that is to say, of clearing out in the earlier thinnings—feeble and badly formed specimens which can hold out no prospect of giving final satisfaction. But if hardwoods are planted at 12 ft. intervals, say 300 to 350 per acre, they must all be retained, no matter whether they are vigorous or feeble, dwarfed or unhealthy. Many cases were brought to our notice where a large proportion of the hardwoods were in such an unsatisfactory condition that, although a pure wood of hardwoods would finally be left on the ground, the volume and quality of the resultant timber could not fail to be thoroughly unsatisfactory. If in place of planting the hardwoods at 12 ft. intervals the whole stocking had been done with hardwoods, the individuals left to occupy the ground, say at thirty or forty years, would undoubtedly be much more promising than under the present system. But by planting pure hardwoods one loses the advantage of useful and remunerative larch thinnings, and the attention of foresters should, therefore, be given to attempting to secure both objects, namely, considerable latitude for selection, and a fair return about the twentieth year from the thinnings. These objects can perhaps best be combined either by planting nothing but hardwoods in every third or fourth row, with the rest of the ground filled up with larch, or by planting the hardwoods in groups of 6 to 10, at 12 to 20 ft. intervals, and filling up with larch. In this way a much freer hand would be given to selection of the hardwoods to be finally retained; and if the yield of larch thinnings was somewhat reduced, we believe that the final result would be more satisfactory. If the present system is persisted in, it would at least be an improvement if the hardwood plants to be used in sheltered situations were allowed to grow in the nursery lines until they are six years old, by which time the individuals possessing strong constitutional vigour could be easily picked out, and only these would be used for planting at 12 ft. intervals, the plants rejected in the nursery being burned, or, in the case of beech at least, used for forming hedges. Although this suggestion is put forward as an improvement upon the present method, it cannot be said to

offer so much prospect of final satisfaction as planting the hardwoods in pure lines or in definite groups.

In all the young hardwood plantations that were brought to our notice we found that a considerable amount of pruning had been done. That pruning is unnecessary is proved by the fact that it is an operation practically unknown in the fine hardwood forests of the continent, but there the initial stocking is much more dense, and the system of nursing is practically unknown. Under our present system, however, it must be recognised that a certain amount of attention must be given to the removal of strong side branches and double leaders; but as this work is necessarily costly, it would seem to be desirable to restrict it to the strong individuals that are destined to stand at least to the middle life of the wood. If pruning is done the separation of the branches should be effected close to the bole, and nothing of the nature of a stump or snag should be left. The latter system of pruning was much in vogue about the middle of last century, but has long since been abandoned as thoroughly irrational by all intelligent foresters, and yet it is necessary to call attention to the matter, because in our tour of inspection we found that the practice is by no means obsolete in Yorkshire.

With regard to the time and manner of thinning, it may be said that a great improvement has taken place during the last few years. Formerly thinning began much too early, the result being that the trees that were left were given room to produce strong rough branches, with consequent knotty and inferior timber in the bole. Now it is recognised that woods should be kept sufficiently dense to secure the suppression of the lower branches at a fairly early age, and as a rule we found that the subject of thinning was well understood and was being rationally practised. Now and again, where game rather than timber was the object in view, the woods had been over-thinned at an early age; and, on the other hand, we also found that the operation of thinning was sometimes being unduly delayed, with the result that there was excessive curtailment of the crowns. But except for an occasional instance of error in the direction of one or other of these extremes, we are glad to be able to say that the thinning of woods is now conducted in an intelligent manner.

Conifers.—When on the subject of pruning we may mention that we seldom found any pruning of live branches of conifers had been done, and in woods of reasonable density such pruning is absolutely unnecessary. We did, however, find that frequently the dead branches of larches had been knocked off by the use of a pole; and as such artificial cleaning of the stems allows air to circulate more freely, and must also result

in the production of cleaner timber, we think that, on the whole, it is an operation to be commended, although when the cost is compared with the advantages gained it may be a little doubtful whether it is a profitable operation.

We had several opportunities of comparing the relative growth of Scots and Corsican pines, and on several occasions—notably at Owston and Ronscliffe—the latter variety at the age of twenty or thirty years was by far the stronger and more hopeful species. We are, of course, aware of the higher death-rate that attends the planting of Corsican pines, but on strong land and at higher altitudes it would appear to be desirable to give more attention to this species.

Three plantations of Japanese larch were brought to our notice situated at altitudes between 700 and 900 feet, and in the case of these woods the common larch of the same age was growing alongside under similar conditions. We had thus an excellent opportunity of revising our opinion of the respective merits of these two species of larch, and we are bound to say that the high estimation in which we have hitherto held the Japanese species has been thoroughly confirmed. The Japanese larch seems to get established more quickly after planting and to take the lead of the other from the first, so that at the age of ten years it is usually about two feet higher than the common larch, the respective heights at that age being about 18 and 16 ft. The death-rate, too, amongst recently set-out plants is somewhat lower for the Japanese larch. While we saw many instances of disease on the common larch we did not find a single example on the Japanese larch growing under precisely similar conditions. That the fungus causing the disease lives on the dead branches of the Japanese larch is a matter of common observation, but it is extraordinarily rare to find the fungus growing parasitically on a living part of this species. Mixed plantations of the two species are known to the writers where practically every stem of the common larch shows a blister, whereas not a single canker spot is to be found upon the stems of Japanese larch equally intermixed over the area with the other species. There is no doubt that the Japanese larch produces stronger and longer branches than the other, and consequently it encroaches more upon other trees with which it may be associated, and unless the plantation is kept somewhat denser the stems on the whole are somewhat coarser. But just because the Japanese larch produces a greater mass of branches it more completely shades the ground, and in a shorter period produces a dense covering of humus over the surface of the soil. In the woods of Japanese larch ten years of age ground vegetation had been so completely suppressed by the dense shade, and the surface of the ground was so closely

covered with a thick carpet of humus, that not a blade of grass or any other weed could be found over the area. It is also to be noted that the stem of the Japanese larch is not quite so straight as that of the other species, and for this reason, and also on account of the stronger branches, it will probably be found that the timber of the Japanese larch is not quite so easy or "kindly" to work. But for such purposes as fencing posts, or rough estate work, a lack of fineness of grain is a matter of little consequence. The fact that the Japanese larch produces a stem scarcely so straight as the other is an additional reason for securing somewhat greater density in the stocking of Japanese woods. There is no doubt that in the younger stages of growth the Japanese larch is much more decorative than the other species, and few finer effects can be produced on a winter landscape than a pure wood of Japanese larch ten to twenty years of age, the pale rose-coloured branches giving a warm glow to the mass. This effect is specially emphasised when the ground is covered with snow, and anyone who has seen this effect is not likely soon to forget it. In the case of the Japanese plantation at Beverley we had an excellent example of the great power of recovery possessed by the Japanese larch when badly broken by snow. A few years ago this plantation, which reaches to an altitude of 920 ft., was deeply buried under snow-drifts, and when the thaw came it was found that many of the trees had been badly broken by the weight of snow. On the occasion of our visit, however, three years after the damage was done, the effects were practically unobservable.

It is worthy of note that nearly all plantations of Japanese larch inspected by us in Yorkshire were situated at high elevations, and this fact, no doubt, accounts, in a great measure, for the success of the plantations. It is also to be borne in mind that the long and severe drought of 1911 did not affect the North of England nearly so badly as the South.

It may be here mentioned that although the Japanese larch has been so favourably commented upon in Yorkshire, there are many plantations which are situated on low, flat elevations in other parts of the country where this variety of larch died off by thousands, especially where the land was poor and sandy. The cause, no doubt, was lack of moisture; some of these trees now dead were planted five or six years ago and were 5 to 7 ft. high in 1910.

No doubt this variety of larch is an excellent tree for the hillsides, but a warning note may not be altogether out of place to future planters when it is urged that very careful thought and attention should be given to situation before forming a plantation on very dry ground.

Some interesting figures relating to cost of plants of Japanese larch have been furnished by Mr. Maughan, agent on Jervaulx Abbey estate, from the nursery there.

Cost of Plants.

| | £ | s. | d. | |
|---|---|----|----|--------------|
| The seed, 3 kilos (about 6½ lbs.), cost . . . | 3 | 7 | 6 | |
| which yielded at least 12,000 plants = . . . | 0 | 5 | 8 | per thousand |
| Lining out in nursery | 0 | 3 | 0 | „ |
| Cost of plants | 0 | 8 | 8 | .. |

Plants and planting per Acre.

| | | | |
|----------------------------------|----|----|---|
| 2,700 plants @ 8/8. | 1 | 3 | 6 |
| Planting @ 2/- per 100 | 2 | 14 | 0 |
| Total cost per acre | £3 | 17 | 6 |

These figures showing cost of raising the plants compare very favourably with the cost of purchasing, besides the saving of carriage and the exposure of a journey. They are also acclimatised from their infancy, and in consequence are much more likely to succeed.

Insects, Diseases, and other Injuries.—On our inspection we encountered examples of the work of the commoner forest insects, but nowhere was the damage excessive. The oak leaf roller caterpillar had frequently devoured a large part of the foliage of mature trees, and at Aldby this insect was so abundant in an oak wood that the fall of the droppings on the dead leaves seemed like the pattering of a light shower of rain. At Byram this insect was comparatively little in evidence, possibly owing to the fact that the atmosphere there is considerably contaminated by factories in the neighbourhood, and it is possible that the foliage is thus rendered distasteful to the insect. The caterpillar of the pine-shoot tortrix moth had, as usual, done a certain amount of damage to young pines—Scots, Corsican, and Black Austrian—and, at Newby, Scots pines four or five years old standing in the nursery were very severely crippled. By removing shoots which are manifestly attacked by this caterpillar sufficiently early, a large number of insects will be destroyed, but it is doubtful whether the permanent effect upon the pest will be appreciable. Here and there one found the end shoots of the leader or branches of the Scots pine excavated by the pine beetle, but foresters now know that by removing fallen pines and their branches in good time the insect has fewer opportunities to breed, and, as a whole, it is probable that this destructive insect is now less abundant than formerly. Larch aphid was in evidence in most

larch woods, but nowhere did we see foliage covered with the white, downy material that indicates a really bad attack of this insect. The beech coccus, of which so much was heard two or three years ago in connection with damage to trees on the Chiltern hills, appears to be very scarce in Yorkshire, in fact we did not notice it until the last wood that we examined, namely, that near the town of Penistone, and there no appreciable damage was being done. At Sledmere, in the Kirby Hill Plantation, most of the Scots pines about five feet in height were being badly defoliated by a pine saw fly caterpillar, which we have since identified as *Lophyrus rufus*, a near relative of the common *L. pini*. *L. rufus* in the caterpillar stage is very like the common pine saw fly but it does not throw itself so markedly into the characteristic S-shaped attitude that the latter assumes on being disturbed. Although *L. rufus* has not been very often recorded in Britain, it is probably not so rare as is imagined, and since our visit to Yorkshire we have had specimens sent from the Crown Woods of Delamere in Cheshire. If taken in time before they have spread all over the tree, the caterpillars are not difficult to get rid of by crushing with the hand, preferably protected by a glove. Perhaps the most serious insect attack that we met with was that due to the larch-shoot moth (*Argyresthia laevigatella*), whose caterpillar works between the bark and the wood at the base of the previous year's shoots. In consequence of its action the shoot generally dies, and it is not infrequent to find that most of the lateral branches of larch trees up to twenty years of age have been killed for 12 or 15 in. from the end, and are projecting bare and dead from amongst the green foliage. Fortunately the insect generally appears to avoid the leading shoot, but now and again it also is attacked, when, of course, the damage done is much more serious. The caterpillar of this insect is much hunted for by tomtits, and possibly other birds, during winter, and it will often be found that these have raised the bark and extracted the insect beneath. It would probably pay well to erect nesting boxes for tits in considerable numbers where larch woods abound.

As regards diseases, we found the common larch canker in considerable abundance, and the fact that we did not see more of it is probably due to the action of intelligent foresters in making a point of clearing out diseased stems in the process of thinning. As previously mentioned, the reputation of the Japanese larch for immunity against this disease was fully confirmed on our tour of inspection. Where a young wood of pines had succeeded an old plantation, a tree here and there had sometimes succumbed to the attack of *Trametes*

radiciperda, which lives as a saprophyte on the old roots and stools, and is apt to spread on to living plants as a parasite. That most destructive root parasite, *Agaricus melleus*, was not much in evidence, partly, no doubt, because it is not till autumn that it produces its characteristic fructifications. The nursery seed beds at Jervaulx Abbey had suffered during previous years from "damping off" due to the fungus *Phytophthora omnivora*, and so much was this the case that the seed beds had to be removed to fresh ground, a proceeding that seems to have had the desired result, as the trouble appears to have been overcome.¹

While it is not to be denied that we saw rabbits in considerable quantity at certain places, there is no doubt that this pest is not so much in evidence now as was the case ten or twenty years ago, and on some estates, notably Byram, a rabbit is quite a rare object. Planters have recognised that rabbit shooting is one of the most costly forms of sport that can be indulged in, and if keepers were made to realise that they hold their positions only so long as rabbits are practically non-existent, the desirable condition of things noted at Byram would be still more prevalent throughout the country generally.

At Byram an unusual form of injury was brought to our notice in the case of an avenue of lime trees. Some years ago the trees were deprived, by pruning, of all their lower branches, with the result that the sun's rays, falling uninterruptedly on the stems, killed the cells of the bark and cortex as far in as the wood. It is well known that when the cortical covering of a thin-barked tree, notably the beech, has been shaded for some years, it becomes very tender, and appears to be unable to withstand the scorching influence of the sun when the rays of the latter are allowed freely to impinge upon it. Beech trees which have hitherto stood in a crowded wood often lose their bark on the south side of the stem in consequence of heavy thinning. The case at Byram, however, is especially interesting in so far as it is probably the first recorded instance of limes suffering in this way; and it is also unique in so far as the removal of the shading had been effected not by thinning but by pruning. At present the trees are disfigured by scars some feet in length on the side facing the sun, and these scars are now in process of healing, but, of course, the stems are much disfigured and reduced in value in consequence of the damage.

¹Writing under date August 10, 1912, Mr. Maughan, Agent on the Jervaulx Abbey Estate, states that "damping off" had again set in, but, acting on advice, the beds were pricked over with a pocket knife, and all dead plants removed. The admission of air to the soil as a consequence of breaking the "brat" on the surface, and the removal of dead and badly infected plants, has done more good than anything previously tried.

General.—The woods that we inspected varied greatly in altitude, one at Rawcliffe being actually within the limits of the tide, while another at Witton Fell, on the Jervaulx Abbey Estate, attained an altitude of 1,150 ft., at which elevation, and fully exposed to the prevailing winds, Scots pine and larch were making very satisfactory growth and had attained an age considerably in excess of 100 years. While most of the woods were below 700 ft., many that were growing in a perfectly satisfactory manner were above this elevation. This applies not only to Witton Fell, but also to other woods on the same estate; while spruce, Douglas fir, beech, and Japanese larch were making excellent growth at Beverley at an altitude of 800 to 920 ft.

A special word may be said about the woodlands on the estate of Owston. These are managed upon the Shelter Wood Selection system, which means that all age-classes are represented on the same area, and that consequently there is no clear-felling. Most of the reproduction is by natural seeding, trees being removed as they reach the period of maturity. The system has many advantages, notably protection of the young seedlings against frost and strong sun, saving of expense in restocking the ground, permanence of the woodlands, and a comparatively non-fluctuating annual revenue, which in the case of the Owston woods aggregates fully 1*l.* per acre gross. This compares very favourably with the average of the whole country, as recently disclosed in the Census of Production Report issued by the Board of Agriculture, where the average for the whole of Great Britain and Ireland is less than 6*s.* per acre. It is a system, however, which can only be practised successfully in the absence of ground game, and, moreover, it makes a greater call upon the care and intelligence of the manager.

The market for timber on the Owston Estate is very good, and we were told prices ranged as follows:—

| | <i>s.</i> | <i>d.</i> | |
|--------------------------|-----------|-----------|---------------|
| Ash | @ | 1 6 | per cubic ft. |
| Birch poles | @ | 0 5 | " " |
| Birch timber | @ | 0 7 | " " |
| Oak | @ | 1 6 | " " |
| Larch (medium) | @ | 0 9 | " " |
| Poplar | @ | 0 5 | " " |
| Turkey oak | @ | 0 8 | " " |

The average price for all classes obtained for annual fellings is given as 1*s.* per cubic foot.

In conclusion, we have pleasure in recording our thanks for the excellent arrangements that had been made for our tour of inspection, notably by Mr. John Maughan, who was responsible for the details of the various visits. We are also indebted to

Mr. C. Howard Taylor for accompanying us during a long day through a rather complicated country, in which, in his capacity as Honorary Secretary of a local Hunt, he appeared to have made himself familiar with every field and wood. While the number of entries of plantations and nurseries, namely twenty-six, was perhaps hardly as many as might have been expected from the County of York, we are sure that this was no fault of Mr. Coltman Rogers, who takes so much interest in these Competitions, and who had put himself to much trouble to let the Competitions be widely known.

CHARLES HANKINS,
W. SOMERVILLE.

FARM PRIZE COMPETITION, 1912.

THE "Royal" Farm Prize Competition for the year 1912 was open to the whole of the county of Yorkshire. The classification and conditions of entry were as follows:—

The following prizes are offered for the best managed farms in Yorkshire:—

CLASS I.—Farm, chiefly Arable, of 200 acres or over, exclusive of Fell or Tidal Marsh Land. First Prize, 100*l.* Second Prize, 50*l.*

CLASS II.—Farm, chiefly Arable, of not less than 50 acres and under 200 acres, exclusive of Fell or Tidal Marsh Land. First Prize, 50*l.* Second Prize 25*l.*

CLASS III.—Stock or Dairy Farm, of 200 acres or over, exclusive of Fell or Tidal Marsh Land. First Prize, 100*l.* Second Prize, 50*l.*

CLASS IV.—Stock or Dairy Farm, of not less than 50 acres and under 200 acres, exclusive of Fell or Tidal Marsh Land. First Prize, 50*l.* Second Prize, 25*l.*

CLASS V.—Farm, chiefly Arable, of not less than 10 acres and under 50 acres. First Prize, 20*l.* Second Prize, 10*l.* Third Prize, 5*l.*

ENTRY FEES:—

Members of the R.A.S.E., Classes I. and III., 2*l.*; Classes II. and IV., 1*l.*; Class V., 10*s.*

Non-Members, Classes I. and III., 4*l.*; Classes II. and IV., 2*l.*; Class V., 1*l.*

CONDITIONS OF ENTRY:—

1.—The competition is limited to Tenant Farmers paying a *bonâ-fide* rent for at least three-fourths of the land in their occupation in the area of the Competitions, the whole of which must be entered for competition.

2.—Competitors must give full particulars of any land in their occupation outside the area of the competitions.

3.—In the case of a Border Farm being partly in Yorkshire and partly in an adjoining County, such Farm will be eligible, provided the Homestead and at least one quarter of the land is situated in Yorkshire.

4.—In assessing the proportion of Arable and Grass Land on the occupation, Rotation Grass must be reckoned as Arable Land.

5.—Competitors must have had the land in their occupation for not less than two years. Farms in occupation from Michaelmas Day, 1909, will be eligible under this Regulation.

6.—In the absence of sufficient merit the Prizes may be withheld.

The Judges were instructed especially to consider :—

General Management with a view to profit.

System of cropping; cleanliness and management of both Arable and Grass Land.

Quality and suitability of Live-stock, especially that bred upon the Farm.

State of Gates, Fences, Roads, General Neatness, and state of Cottage or Cottages, so far as Tenant is liable.

Management of the Dairy and Dairy Produce, where Dairying is pursued.

The duration of the tenancy.

Mode of Book-keeping followed (if any).

The gentlemen appointed to judge the farms were :—

For Classes I. and II.—Mr. Henry Giles, Norwich; Mr. Henry Hawking, Avondale, Easingwold, Yorks.

For Classes III., IV. and V.—Mr. George Harrison, Gainford Hall, Darlington; Mr. George G. Rea, Middleton, Wooler, Northumberland.

The number of entries received was as follows :—Class I., 17 entries; Class II., 9 entries; Class III., 10 entries; Class IV., 10 entries; Class V., 3 entries.

The awards will be found on p. lxxxv.

The farms entered were good representatives of their respective classes and produced keen competition. This report deals with some only of the best of the farms seen, and is not in any sense a report upon the farming of the county, which is of a varied and extensive character. A report upon the general farming of the County of Yorkshire, possessing as it does more acres (3,882,851) than there are letters in the Bible (3,566,480), would require a volume to itself.

Taking the farming as seen, it may be summarised as being good and sound, while not presenting any very marked characteristics. There was, so to speak, nothing new, the guiding principle being a whole-hearted faith in old and well tried methods.

The warp land farm of Mr. Coleman, at Eastoft, presented features of peculiar interest and exceptional character which have to be seen to be appreciated. This was a curious farm to judge along with others, and this fact must be considered rather as a misfortune than as a fault, in connection with Mr. Coleman's place in the awards. An interesting feature was the general appreciation of the truly helpful work amongst farmers that is being done by the Yorkshire College at Leeds, both by way of demonstration and by classes for farmers' sons, arranged for convenient periods.

It is always refreshing to see the great interest which the north-country horse keeper takes in his horses and their gears, and the resultant well-groomed, well-cared-for appearance.

REPORT OF JUDGES IN CLASSES I. AND II.

FIRST PRIZE FARM IN CLASS I.

Occupied by Mr. Richard Machin, Cattal Grange, Whixley, Yorkshire.

This farm consists of 252 acres arable and 145 acres grass, and has been held on yearly tenancy by Mr. Machin under Major Dent for thirty years. The soil is of a mixed character, varying from a strong loam to a sandy nature, but it is "two-horse" land and suitable for folding by sheep. The course of cropping pursued is a six course—roots, barley, barley, seeds, wheat, oats. The strong land has seeds followed by oats, followed by wheat, and the light land has seeds followed by wheat followed by oats. The oats following seeds on the strong land receive 6 cwt. of rape dust and are top dressed. The cropping for 1912 was : seeds, 39 acres ; wheat, 18 acres ; oats, 63 acres ; roots, 51 acres ; and barley, 80 acres ; total, 251 acres. Roots receive 15 to 20 tons of farmyard manure and 5 cwt. best fish meal per acre. Barley after roots is manured for by the sheep folded on the roots on which they receive cake. Of the swede crop twenty-seven rows are fed on the land for every eighteen drawn off. Barley after barley receives eight loads farmyard manure per acre. The seeds mixture consists of 7 lb. red clover, 2 lb. alsike, 6 lb. white clover, and 1 lb. Italian rye-grass. The seeds are partly mown and partly pastured, the latter having cake eaten on by sheep. Every sixth year 1 ton of lime is applied per acre for the seeds crop to keep the land sweet and free from moulds. Wheat or oats coming after seeds receives nothing but the manure left by the pasturing sheep. The grass land, of which 177 acres are grazed and 28 acres mown, receives seven loads farmyard manure and special grass manure in alternate years for the mowing land, and the pasture is grazed by bullocks which are heavily fed with cake.

The stock seen consisted of fourteen non-pedigree Shire horses from three to five years old, two driving horses, ninety-five Irish bullocks, six home-bred cows, three home-bred heifers, five home-bred yearlings, 350 cross-bred hoggets, forty pure Berkshire-bred pigs, and nine large black pigs.

Too much cannot be said of the quality of the stock on this farm. The Horses are all under six years old, it being the custom of this tenant to buy in young horses to work the land, and sell them out as soon as they are suitable for town work, and by so doing making a profit on his farm horses.

Cattle.—About 160 prime three-year-old bullocks of splendid quality. Over 200 are made fit for the butcher during the year. These are all bought in to graze, and consume large quantities of cake and meals on the holding.

Sheep consisted of 350 hogs bred out of Lincolnshire ewes and sired by Hampshire and Oxford rams. These get a liberal allowance of cake and clover or hay in racks when feeding on the roots.

Pigs.—A very fine lot of Berkshires, bred on farm with the exception of the sire. These are sold out when fat, a certain quantity being killed and used on the farm.

Implements.—These were all of modern type. Steam power used for threshing, grinding, cake crushing and other purposes, all being erected by the tenant.

The horses are a very good lot indeed. They receive chopped oat straw and about 12 lb. each of a mixture of ground oats, beans, and bran, in the proportion of seven, three, and two per day. The cattle in yards are turned out to grass for a short time every day, and have from November to January about 6 lb. each of cotton cake and 3 lb. of decorticated cotton meal mixed with straw chop. They are foddered up with straw at night. After January 1, they are given pulped roots, which are continued until the animals go off fat. Fifty of the bullocks seen in December, fattened off on swedes, cake, and meal, would go off fat shortly after Christmas. Four hundred sheep are bought during August, and go on the maiden seeds and "after grass," to be subsequently folded on the turnips during winter.

Labour runs to about 600*l.* per annum. Purchased manure 160*l.*, and purchased foods about 1,100*l.* Labour in this district runs at about 17*s.* to 18*s.* per week with house and garden and milk free.

The only piece-work at this farm is setting out and singling turnips and looking over the second time, which is paid for at 9*s.* per acre. Turnip pulling and cleaning 8*s.* 6*d.* There are two sets of good buildings well placed and suitable to the holding, which are kept in excellent order. A great deal of improvement has been effected by the tenant himself, consisting of fencing, replanting and guarding hedges, making new and permanent watering places and making and maintaining new roads, all of which have been well done. This is a corn-growing farm, well adapted for grazing sheep and cattle. It is in an excellent state of cultivation, condition, and cleanliness. It is very well managed and could not be in better hands, and whilst the tenant is proud of his landlord, the landlord has every reason to be proud of his tenant.

The ordinary cultivation of this farm, which showed no preparation for competition, makes it an ideal place to exhibit, and would do credit to any county. The fences, gates, roads, and farm generally show that they have been watched and skilfully guided for years. The fences are all well trimmed, wide at the bottom, making both a strong fence and shelter for

stock and incidentally for partridges. Both arable and grass land very clean and well cropped. This is a well-managed farm which impressed one as being occupied by a clever and well-guided business man.

SECOND PRIZE FARM IN CLASS I.

Occupied by Mr. Christopher Danby Wright, The Grange, Nafferton, Driffield.

This farm consists of 379 acres arable and 40 acres grass land, and is held under yearly tenancy from Mr. A. J. Wyse, Wold House, Nafferton. It has been occupied by Mr. Wright for seven years. It is all wold land with a chalk sub-soil, and is farmed on a five-course system—turnips, oats, seeds, wheat, barley. The cropping for 1912 was as follows:—82 acres wheat, 81 acres barley, 70 acres oats, 70 acres roots, 73 acres seeds; total 376 acres. All the grass land is grazed, and receives a dressing of about ten tons of farmyard manure per acre every five years, and meantime a dressing of 5 cwt. superphosphate and 2 cwt. sulphate of potash per acre. The root crops are manured with 15 tons farmyard manure, 3 cwt. superphosphate, and $1\frac{1}{2}$ cwt. dissolved bones, the mangold crop receiving in addition a top dressing of $\frac{1}{2}$ cwt. of nitrate of soda mixed with $\frac{1}{2}$ cwt. common salt per acre. Oats follow roots fed on the land by sheep and receive no special manuring. The seeds mixture consists of red clover, 6 lb.; white clover, 6 lb.; trefoil, 6 lb.; alsike, 6 lb.; rib grass, 3 lb., or 27 lb. per acre; and is left down for one or two years. Wheat receives 15 tons per acre of farmyard manure, which is spread on to the seeds and ploughed in during autumn. Barley receives 84 lb. superphosphate and 28 lb. nitrate of soda per acre.

The stock consists of 160 ewes, all home-bred, of the Lincoln and Leicester cross-breed, 240 home-bred lambs, 200 cross-bred lambs (purchased), nineteen strong bullocks (bought in to feed), seventeen strong bullocks and heifers (eleven bought and six bred), seventeen two-year-olds (eight bought and nine bred), ten home-bred yearlings, six milk cows (purchased), three young home-bred calves, twelve cart-horses (four of which were bred at home), six young horses (two of them home-bred), one trap-horse, one hunting mare, and seventy-four pigs. No cake is used in the summer time except for the milk cows, which receive 6 lb. per day per cow. One cake is given to the score sheep when feeding on the roots in winter, with an addition of $\frac{1}{2}$ lb. maize per sheep when February comes in. Bullocks are given 2 bushels of turnips per day, and 11 lb. to 12 lb. of maize germ and grain meal, Young beasts have 1 bushel of turnips and about 4 lb. of maize

germ and grain meal each. Milk cows have turnips, ground oats, and about 5 lb. of cotton cake each.

Labour costs about 466*l.* per annum, manures 71*l.*, purchased foods about 230*l.*, and the value of home-grown produce annually consumed on the farm is about 200*l.* Turnip-hoeing here costs about 5*s.* per acre once over, and stooking corn 1*s.* per acre all round.

All the hedges on the farm, except three, have been cut to the ground and cleaned by the tenant. Four stalls in the cart-horse stable, a new cart-shed, four loose boxes, and the engine-house have all been erected, and several concrete floors laid, all at the tenant's expense. The cart-horses are mostly young ones bred on the farm, and very suitable for their work. This tenant tries to breed some Shire foals yearly, and by so doing has horses to spare for sale that have been bred on the farm. Of the cattle, some are bred, the others purchased. About six cows of the Shorthorn type are kept for milk, butter-making, and calf-rearing. Bullocks are purchased to consume the roots and straw, and thus make manure in the open yards, which have excellent shed accommodation. There are 160 sheep of the Lincoln and Leicester type, which are crossed with the Oxford and Lincoln rams. The tenant also buys more sheep in the autumn to consume the roots on the land, thus manuring it for the following crops. The sheep are kept on the land until early spring, when they are clipped and sent off to the markets. Three-quarters of the roots are fed on the land, and one-quarter drawn to the homestead to be consumed by the bullocks.

There is a herd of large white pigs, nearly all bred on the farm. They are sold for pork and bacon. About 200 cross-bred poultry are kept, the produce of which is sold in the local market.

The implements are all modern. There is an oil-engine for grinding, chaff-cutting, and other purposes. The corn crops all look promising. Splendid stacks of wheat of 1911 produce were seen. Seeds and grass fields all well stocked with sheep and cattle, and all around the house and homestead well stocked with poultry. Altogether the management and stocking of this farm reflect great credit upon Mr. and Mrs. Wright.

FIRST PRIZE FARM IN CLASS II.

Occupied by Mr. George Wass, Wombleton Grange, ^NRawton, Yorkshire.

This farm consists of 193 acres, 30 of which are old grass and 163 arable. It is held on a yearly tenancy under the Earl of Feversham and has been occupied by Mr. Wass for eighteen

years. The soil consists of a medium loam and some clay. Perfect freedom of cropping is enjoyed and the general acreage under crops was as follows :—Barley, 45 acres ; wheat, 31 acres ; oats, 24 acres ; swedes and turnips, 25 acres ; maiden seeds for mowing, 9 acres ; while other 9 acres maiden seeds had been ploughed out and sowed with corn, having proved too weak, owing to the excessively hot summer, to be allowed to stand. Mr. Wass always aims at a full crop and never allows weak ones to stand if this can be avoided. This may cause temporary disproportion of roots, seeds or corn. Thus, this year the sowing of 30 acres of permanent grass caused a slight disturbance of acreage under various crops.

Cropping and Rotation.—The usual system of cropping followed is turnips, barley, oats or barley, clover, wheat. Seeds are sown only once in seven or eight years and the cropping rotation is sometimes varied by taking a third white crop of wheat or barley in order to ensure a period of rest from clover for the land intended to be sown with seeds. Twenty acres of land were this year in the third white crop and looked well and clean.

Three acres of old grass were reserved for mowing, the remainder being grazed. Of the 30 acres newly-laid grass for permanent pasture, 23 acres have been allowed for by the landlord who returns to his tenant the amount of his seeds bill which generally runs about 25s. per acre. He allows also basic slag for one or two dressings subsequently. The mixture used for laying down land to permanent pasture contains small quantities of all the best grasses and herbage, experience having demonstrated the fact that generally those grasses survive which are best suited to the soil.

Manures and Manuring.—The manures used on this farm are practically confined to farmyard manure and proportionate allowances of basic slag, superphosphate, kainit, sulphate of ammonia, and nitrate of soda. Variations of the nitrogenous manures are made according to the crop to be manured. For the pasture land, basic slag at the rate of 8 cwt. per acre is used, while that for hay is given 6 tons of farmyard manure one year, and the next, 3 cwt. of superphosphate and 1 cwt. nitrate of soda. This alternate manuring costs about 17s. 6d. per acre. The basic slag is not applied every year. One year is allowed to pass then the slag is repeated ; another year passes then superphosphate at the rate of 3 cwt. per acre is applied. After another year the basic slag treatment comes on again and the process is repeated. The system of manuring for corn crops may be briefly stated as follows :—For *wheat*, 8 tons of farmyard manure spread over the land in the autumn, 2 cwt. of superphosphate, 2 cwt. kainit applied at sowing, 1 cwt. nitrate

of soda applied in the spring. For *barley*, 2 cwt. superphosphates, 2 cwt. kainit, and 1 cwt. sulphate of ammonia per acre put on with the seed. For *oats*, 2 cwt. superphosphate, 2 cwt. kainit and 1 cwt. nitrate, the last named being applied soon after the oats have got into blade.

Stock-breeding and Feeding.—The stock consists of eleven horses, fifty-three cattle, 170 sheep and about forty pigs.

Horses.—All the horses are of the Shire breed and are all young and very fit for their work. This is accounted for by the generous rations which are allowed during the winter and spring seasons. The working horses are allowed 1 stone of rolled oats, and $\frac{1}{2}$ stone of bran per day, with a small quantity of hay to regulate the other foods.

Cattle.—These consist of six cows and six calves, all bred on the farm. Other fourteen calves and twenty-one blue-polled cattle for feeding during winter were purchased.

The calves are all reared by Mr. Wass, who gives special attention to this department, and has been very successful. They are allowed new milk until they are one month old. They are then given a special meal mixture consisting of 4 stones wheat, 2 stones linseed, and 2 stones Scotch oatmeal, all ground together and served as "skilly."

The feeding cattle are a fine lot of blue-polled bullocks, bought, and fed in covered folds, growing into splendid beef. The summer cattle have nothing but grass; in winter, they are fed with $\frac{1}{2}$ bushel (about 21 lb.) of roots, three times per day. They are started with about 6 lb. of cake per day and the allowance is gradually increased up to 12 lb. per day. The cake given consists of linseed cake, cotton cake, and Silcox cake. The cake allowance does not interfere with a meal allowance of 2 lb. per day which is given. The general practice is to watch closely the feeding of the bullocks and to make slight variations in the cake and other allowances as judgment suggests.

Sheep.—The sheep flock consists of sixty-five ewes and their followers, 105 lambs. The ewes are of the Lincoln and Leicester cross and the lambs by a Lincoln tup. Other sixty lambs are brought in to eat the roots on the land. The system of feeding these is as follows:—They are started on $\frac{1}{2}$ lb. of linseed cake and cotton cake per day with as many roots as they will eat. The cake allowance is increased up to 1 lb. per head per day, and $\frac{1}{4}$ lb., increased to $\frac{1}{2}$ lb., *whole* maize is added.

Pigs.—These are mostly of the Yorkshire breed, and are kept in the covered folds and fed on sharps and barley meal.

Poultry.—All kinds of poultry are kept of which there are about 350 head. Great care and attention is bestowed on these, and while cross breeds are kept because most profitable, pure bred male birds are always procured. From the receipts

which were shown to us it was evident that with the great care and attention bestowed upon them both as to housing and feeding, they are a very profitable item on the farm. They are fed generally on maize and a little offal corn. Turkeys, geese, and ducks are fattened on maize meal and barley meal, and are also given as much whole maize and barley as they will eat.

This farm is an extremely well-conducted holding. Ever since Mr. Wass started farming he has made a practice of selling all his corn off the farm, and purchasing meals, cakes, and maize. The large quantity of stock kept accounts for the large cake and corn bills for some years back. Labour, including board and lodging for five men who live in, runs up to 220*l.* per annum. Manures purchased cost 110*l.*, while purchased foods amount to about 700*l.* per annum. A tidy and well-conducted holding, it reflects great credit on both master and mistress. The buildings, gates, fences, and ditches are all clean and very tidy, and the great secret of success is the thoroughness of the administration and the good cultivation of the land. Mr. Wass does not hesitate to adopt any new idea though he holds to a proved system until the worth of new methods has been established. This applies to cropping, manuring, stock-breeding, and feeding.

The cleanliness of the land is the natural sequence of regular good crops and good cultivation of land, which responds well to generous treatment. When a field shows the slightest exhaustion a liberal manuring with both farmyard and artificial manures is immediately given, and this treatment has been uniformly profitable. Ground lime has proved to be extremely valuable, $\frac{1}{2}$ ton per acre being used where land is found suffering from lack of lime.

SECOND PRIZE FARM IN CLASS II.

Occupied by Mr. Charles Beech, Old Forest, Walshford, Wetherby.

This farm consists of 50 acres arable and 34 acres of grass land. It is held on a yearly tenancy under Major Dent, and has been occupied by Mr. Beech for seven years. The soil is a medium loam, 30 acres of which can be ploughed with two horses, the remainder (20 acres) requiring three. The sub-soil is gravel.

The system of cropping followed is :—Turnips, barley, seeds, oats, wheat, mangolds, and potatoes, followed by two white crops. The turnips are manured with 15 to 20 loads of farmyard manure, 4 cwt. superphosphate, 2 cwt. kainit, and 1 cwt. sulphate of ammonia. Every year 15 cwt. to 1 ton of lime per acre is worked into the land before the root crop.

Barley follows the turnips, and is not specially manured. The seeds mixture consists of 5 lb. red clover, 3 lb. cow-grass, 2 lb. alsike, 1 lb. trefoil, 5 lb. white clover, and 4 lb. Italian rye-grass. The seeds are left down for one year only, and all pastured. Oats after seeds do not receive any special manure. Mangolds and potatoes receive 20 loads farmyard manure, 4 cwt. superphosphate, 2 cwt. kainit, and 1 cwt. sulphate of ammonia. Mangold ridges are made after harvest, about 16 tons of manure per acre put in the ridges, and well ploughed in, with three horses in digger, about Christmas; harrowed down in the spring, and $\frac{1}{2}$ ton of ground lime, 4 cwt. superphosphate, 2 cwt. kainit, and 1 cwt. sulphate of ammonia per acre applied. After singling out, 1 cwt. nitrate of lime is given.

Swedes receive about 14 tons of manure, 15 cwt. ground lime, 4 cwt. superphosphate, 3 cwt. kainit, and, in the spring, 1 cwt. sulphate of ammonia or nitrate of soda per acre.

The wheat or oats following mangolds or potatoes is not specially manured. Wheat after oats receives about 8 tons of manure per acre when available. If not available, it receives 3 cwt. superphosphate applied in February as a top-dressing, and 1 cwt. nitrate of soda or nitrate of lime in April. The second white crop, generally oats, receives 1 ton of guano spread over 6 or 7 acres. One-third of the turnips is fed on the land, and two-thirds are drawn off for the cattle.

About one-third of the mowing land receives 8 loads farmyard manure per acre each year, and in the month of April 1 cwt. nitrate of lime. The remainder receives 3 cwt. superphosphates, 2 cwt. kainit, and 1 cwt. of nitrate of soda.

In 1909 the pasture land (24 acres) received a light dressing of salt; in 1910 about $\frac{1}{2}$ ton of lime; and receives a few loads of manure every year where required. The same land is hayed each year, and the pasture is kept as such.

The cropping this year consisted of 10 acres of wheat, 1 acre of tares for horses, 5 acres pastured seeds, 8 acres turnips, 5 acres mangolds, 3 acres potatoes, 8 acres barley, and 10 acres oats.

The horses are kept in good working order, and receive daily, in winter, hay, crushed oats, molassine meal, chopped oat straw, and two swede turnips; in summer they have grass and tares. There are eight horses on the farm, six of them being home-bred.

There are thirty-four cattle, seven milk cows (three of them purchased), young stock of all ages (fourteen purchased as calves, and thirteen bred). Three-fourths of them are a cross-breed of Shorthorn type, and the remainder Black Angus and Shorthorn cross.

Cows each receive daily 3 to 4 bushels turnips, 4 lb. cotton-cake, about 2 lb. compound meal, 1 lb. wheat-meal, and chopped oat-straw. Cows are kept for butter and milk, which department is managed by Mrs. Beech and her daughter. Spare milk is used in bringing up calves. About 30 lb. of butter are made per week. In summer cows receive grass and 4 to 5 lb. cotton-cake. The calves have new milk till a month old, then are gradually put on to separated milk and Bibby's cream equivalent, with a little hay and compound cake.

Feeding bullocks receive 7 to 10 lb. turnips, cotton-cake, maize-meal, compound meal, and wheat-meal all mixed together; also chopped oat-straw. Bullocks are agisted in summer.

There are seventy sheep (49 bred and 21 purchased), composed of 42 hoggs and 2 cast-ewes on turnips, and twenty-four ewes and one ram on the grass. The ewes and lambs are on seeds in summer, and have a little cake. The lambs that get fat are immediately sold, and the remainder are put on the turnips and receive about $\frac{1}{2}$ lb. of cotton-cake and $\frac{1}{2}$ lb. Thorley's cake each per day, along with chopped hay.

There are twelve pigs—large White and large Essex cross. The fat pigs receive wheat-maize and Bibby's pig meal in such quantities as they can consume without waste, the store pigs receiving potatoes and a little meal. The pigs are all bred on the farm, and sold at a profit as early as possible.

There are about 200 head of poultry of mixed breeds, the produce from which forms a considerable item by sales of chickens and eggs, for both of which they have good markets at hand.

Manures cost 50*l.* per annum and purchased foods average 180*l.* All the straw, hay, turnips, and mangolds are consumed on the farm and a considerable portion of the corn. The whole of the work is done by Mr. Beech and his three sons. The only out-going expenditure on labour is for threshing, and such work amounts to about 10*l.* per annum.

The tenant has effected several improvements on the farm, including the planting of young fruit trees, fixing a horse-wheel with shafting, &c., a chopper and mills, and has been to the expense of erecting a Dutch barn 80 ft. long by 20 ft. wide.

A considerable length of rough high hedge has been cut down and other hedges on the farm have been well layered.

The roads, fences, gates, and buildings are well maintained and the farm is well cultivated and excellently worked.

The interesting tables which follow have been kindly provided by Mr. R. H. Rew, of the Board of Agriculture and Fisheries.

Acres under Crops and Grass and Number of Live Stock in Yorkshire in the Years 1912 and 1891.

| | East Riding | | North Riding | | West Riding | | Total Yorkshire | |
|--|------------------|----------------------|--------------------|----------------------|--------------------|----------------------|--------------------|------------------------|
| | 1912 | 1891 | 1912 | 1891 | 1912 | 1891 | 1912 | 1891 |
| Total Area (excluding water) | Acres 751,890 | | Acres 1,357,433 | | Acres 1,763,304 | | Acres 3,872,627 | |
| Total Acreage under Crops and Grass ¹ | 675,336 | 669,393 | 865,421 | 864,755 | 1,176,105 | 1,221,170 | 2,716,862 | 2,755,318 |
| Arable Land | 450,046 | 466,392 | 328,607 | 362,663 | 356,305 | 386,159 | 1,134,958 | 1,215,214 |
| Permanent Grass | 225,290 | 203,001 | 536,814 | 502,092 | 819,800 | 835,011 | 1,581,904 | 1,540,104 |
| Wheat | 70,164 | 72,892 | 28,663 | 36,913 | 50,182 | 58,614 | 149,009 | 168,419 |
| Barley or Bere | 74,899 | 66,951 | 74,374 | 72,564 | 51,367 | 59,721 | 200,640 | 199,236 |
| Oats | 84,603 | 85,954 | 66,223 | 73,477 | 77,805 | 75,081 | 228,631 | 244,512 |
| Rye | 3,309 | 1,633 | 2,330 | 1,147 | 2,829 | 1,698 | 8,468 | 4,478 |
| Beans | 6,223 | 7,424 | 2,092 | 4,721 | 1,135 | 5,073 | 9,450 | 17,218 |
| Peas | 5,995 | 7,511 | 1,858 | 3,318 | 4,692 | 5,236 | 12,545 | 16,065 |
| Potatoes | 12,306 | 12,216 | 12,753 | 10,470 | 27,786 | 22,483 | 52,845 | 45,169 |
| Turnips and Swedes | 73,931 | 74,878 | 49,245 | 56,726 | 47,597 | 59,098 | 170,773 | 190,702 |
| Mangold | 10,253 | 4,865 | 8,303 | 2,360 | 9,316 | 2,827 | 27,872 | 10,052 |
| Cabbage | 376 | | 247 | | 1,437 | | 2,060 | |
| Kohl-Rabi | 171 | 7,683 ³ | 97 | 3,506 ³ | 79 | 2,047 ³ | 347 | 13,236 ³ |
| Rape | 4,095 | | 2,021 | | 726 | | 6,842 | |
| Vetches or Tares | 2,952 | 4,163 | 1,370 | 2,233 | 2,657 | 3,245 | 6,979 | 9,641 |
| Lucerne | 143 | 3,683 ³ | 100 | 516 ³ | 194 | 3,650 ³ | 437 | 7,849 ³ |
| Other Crops | 2,374 | | 723 | | 5,286 | | 8,383 | |
| Small Fruit | 561 | 841 | 429 | 578 | 813 | 1,474 | 1,803 | 2,893 |
| Clover, Sainfoin, and Grasses under Rotation | 87,150 | 90,423 | 67,543 | 73,914 | 66,631 | 74,430 | 221,324 | 238,767 |
| Bare Fallow | 10,541 | 15,275 | 10,236 | 20,220 | 5,773 | 11,482 | 26,550 | 46,977 |
| Mountain and Heath Land used for Grazing | 2,344 | 837 ⁴ | 243,838 | 287,594 ⁴ | 233,983 | 188,974 ⁴ | 480,165 | 477,405 ⁴ |
| Orchards ⁵ | 837 | 868 | 1,178 | 979 | 1,529 | 1,608 | 3,544 | 3,455 |
| Horses used for Agriculture ² | No. 25,394 | No. 26,065 | No. 28,401 | No. 28,259 | No. 39,819 | No. 40,042 | No. 93,614 | No. 94,366 |
| Stallions | 260 | | 198 | | 365 | | 823 | |
| Others:—One year and over | 8,227 | 16,600 ³ | 8,473 | 15,543 ³ | 9,657 | 16,701 ³ | 26,357 | 48,844 ³ |
| „ Under one year | 3,946 | | 4,207 | | 3,972 | | 12,126 | |
| Total | 37,827 | 42,665 | 41,279 | 43,802 | 53,813 | 56,743 | 132,919 | 143,210 |
| Other Horses | 3,220 | — | 3,754 | — | 9,451 | — | 16,425 | — |
| TOTAL OF HORSES | 41,047 | — | 45,033 | — | 63,264 | — | 149,344 | — |
| Cows and Heifers | 20,626 | 27,191 ³ | 43,081 | 58,290 ³ | 93,542 | 132,316 ³ | 157,249 | 217,797 ³ |
| Other Cattle:— | 7,550 | | 13,593 | | 33,338 | | 54,481 | |
| Two years and above | 22,644 | 25,149 | 42,175 | 45,342 | 53,292 | 55,945 | 118,111 | 126,436 |
| One year and under two | 25,452 | 36,807 ³ | 42,469 | 75,840 ³ | 45,325 | 92,851 ³ | 113,246 | 205,498 ³ |
| Under one year | 20,841 | | 41,578 | | 43,564 | | 105,983 | |
| TOTAL OF CATTLE | 97,113 | 89,147 | 182,896 | 179,472 | 269,061 | 281,112 | 549,070 | 549,731 |
| Ewes kept for breeding | 159,736 | | 286,629 | | 265,119 | | 711,484 | |
| Other Sheep:— | | 293,057 ³ | | 459,058 ³ | | 442,753 ³ | | 1,194,868 ³ |
| One year and above | 93,748 | | 128,226 | | 114,111 | | 336,085 | |
| Under one year | 209,812 | 201,421 | 320,071 | 310,951 | 284,878 | 310,535 | 814,761 | 822,907 |
| TOTAL OF SHEEP | 463,296 | 494,478 | 734,926 | 770,009 | 664,108 | 753,288 | 1,862,330 | 2,017,775 |
| Sows kept for breeding | 7,387 | 64,998 ³ | 8,215 | 65,613 ³ | 13,351 | 94,691 ³ | 28,953 | 225,302 ³ |
| Other Pigs | 52,633 | | 48,016 | | 99,020 | | 199,669 | |
| TOTAL OF PIGS | 60,020 | 64,998 | 56,231 | 65,613 | 112,371 | 94,691 | 228,622 | 225,302 |

¹ Not including Mountain and Heath Land.² Including Mares kept for breeding.³ Not separately distinguished in 1891.⁴ Returns of Mountain and Heath Land were not collected in 1891. The figures given relate to 1892.⁵ Also included under the particular crop or grass grown under the trees. ⁶ Not collected in 1891.

The Judges and the writer desire to return thanks to the competitors for the kindness with which they were received.

WILLIAM H. HOGG.

Board of Agriculture for Scotland,
St. Andrew's Square, Edinburgh.

We subscribe to the foregoing Report :—

HENRY GILES.

HENRY HAWKING.

REPORT OF JUDGES IN CLASSES III., IV. AND V.

FIRST PRIZE FARM IN CLASS III.

Occupied by Mr. H. Atkinson, Yafforth Lodge, Northallerton.

This farm is situated about two miles from Northallerton. It is held on a yearly tenancy under the Executors of the late Colonel Trafford Rawson, of Roche Court, Salisbury, and consists of 221 acres arable and 283 acres grass. The holding is carried on principally as a stock farm.

The soil differs from a good loam to a stiff clay, the subsoil being of various kinds.

The holding is divided into two farms, one called Yafforth Lodge at which Mr. Atkinson lives, which consists of 171 acres arable and 181 grass, and the other called Yafforth Moor Farm, which consists of 50 acres arable and 102 acres grass. The arable land at Yafforth Lodge is cropped on a five-course system, namely, seeds, potatoes, oats or wheat, swedes, mangolds or cabbage, barley, and the arable land at Yafforth Moor Farm on the ordinary four-course system. There is practically no catch cropping in the district. In 1912 the cropping on the two farms taken as a whole was as follows :—Potatoes, 40 acres; barley, 42 acres; wheat, 15 acres; oats, 30 acres; clover, 34 acres; swedes, 37 acres; mangolds, 12 acres; cabbage, 2 acres; beans, 7 acres; and tares, 2 acres. The following quantities of artificial manures and farmyard manure are used for the different crops : *Potatoes*—8 tons farmyard manure, 1 cwt. sulphate of ammonia, 1 cwt. sulphate of potash, 2 cwt. superphosphate. *Barley*—turnips and cake eaten on average yield about 5½ quarters. *Wheat*—8 tons farmyard manure per acre. Square-head Master is chiefly grown and yields about 5 quarters. *Mangolds*—8 tons farmyard manure, 4 cwt. salt, 5 cwt. superphosphate, 2 cwt. kainit, 1½ cwt. nitrate of soda per acre. *Cabbage*—12 tons farmyard manure, 2 cwt. nitrate of soda, 4 cwt. superphosphate per acre. *Swedes*—6 tons

farmyard manure, 1 cwt. sulphate of ammonia, 5 cwt. superphosphate, 2 cwt. kainit, 1 cwt. nitrate of soda (if a dry season) per acre. *Beans*—8 tons farmyard manure per acre. *Clover*—4 cwt. superphosphate per acre. *Oats*—1 cwt. sulphate of ammonia, 3 cwt. superphosphate, 1 cwt. kainit per acre. The oat yield is about 9 quarters. These quantities are about an average, they are governed of course by the quality of the land. Seeds are never left down more than one year. The grass land intended for hay has hay, cake and roots fed on, and also receives farmyard manure, basic slag and superphosphate. The pastures have cake fed on and those pastures that are on strong land receive basic slag every third year. The pastures are excellent, as proved by the fact that the stock which are home-bred are fit for the butcher as yearlings. The seeds mixture for temporary pasture is 6 lb. white clover, 6 lb. red clover, 2 lb. hybrid cowgrass, 2 lb. alsike, 4 lb. trefoil, 4 lb. Italian rye-grass, 2 lb. rib grass per acre, which makes a heavy seeding. The mixture for hay consists of 7 lb. red clover, 3 lb. cow-grass, 2 lb. alsike, $1\frac{1}{2}$ pecks Italian rye-grass.

The stock on the farm consisted of:—

22 Cart horses (19 home bred) 1 hunter, 2 ponies.

10 Aberdeen Angus cattle (all home bred), 2 cows (1 home bred).

About 180 Irish bullocks are grazed in the summer, bought in chiefly at York.

220 Oxford Down ewes (all home bred).

500 Feeding hogs.

22 Berkshire pigs (20 home bred).

170 White Orpington poultry (home bred).

22 Indian runner ducks (home bred).

The horses taken as a whole were one of the finest lots we had the pleasure of seeing in the competition. In winter they receive old hay, crushed oats and chopped oat straw; in summer grass, and oats when working.

The bullocks were as good Irish as could be bought, which is saying a lot, and were consistent in type, all looking like good feeders. Mr. Atkinson feeds all the year round, selling off as the cattle get fit. The bullocks receive in winter pulped roots, chopped oat straw and hay, 8 lb. cake and 2 lb. meal; in summer the forward bullocks get 8 lb. mixed cake and grass, and the stores 4 lb. cake which is gradually increased to 8 lb. The two cows are kept to supply the house and look good dual-purpose cattle.

As regards the Oxford Down Sheep, the ewe flock is pure and all are entered in the herd book. The flock was founded in 1907 with blood from Mr. Heslop, Mr. John White and Mr. Elliott. Lambing takes place in February and March, and this year resulted in a crop of 175 per cent. of lambs. Most of the ram lambs are sold about home, averaging from 4*l.* to 5*l.* Some

few go to York, Kelso, &c. The best of the ewe lambs are drafted into the flock. The feeding hogs are purchased in September and sold out from January to March, receiving $\frac{3}{4}$ lb. mixed cake, turnips, hay and as much oat straw as they can eat. The ewes run on the grass land and Mr. Atkinson starts to hand feed them at the beginning of January. The ewes and lambs are on the seeds in summer, and the lambs have a creep to cake troughs and receive about $\frac{1}{2}$ lb. daily.

The Berkshire pigs looked good sorts.

The poultry are all pure bred and bring in quite a lot of money each year, eggs making up to 2d. each in winter and very seldom less than 1d. in summer.

The standing wage for labourers is 17s. a week, and labour is good and plentiful in the district. The following are the piece-work prices on the farm:—Spreading manure and planting potatoes, 5s. 6d. per acre; hoeing turnips twice, 9s. per acre; and pulling swedes, 8s. per acre. The harvesters receive 20s. extra for the season. Twelve men are regularly employed and extra hands are taken on as occasion requires. There are seven cottages on the farms and these the men inhabit rent free. Labour here costs between 24s. and 25s. per acre, purchased foods nearly 830l. per annum, (besides which the following amounts of home-grown produce are consumed on the farm—Oats, 250l.; beans, 40l.; barley, 20l.; wheat, 50l. and potatoes, 20l.) and artificial manures just over 210l. The farm was occupied by Mr. Atkinson's grandfather, then by his father, and Mr. Atkinson has held possession for the last seventeen years.

The buildings are very compact, in good condition and well adapted for the purpose for which they are used. The stables have plenty of light and air, and the outside yards are good. Implements are good and well looked after and the general appearance everywhere is neat and tidy. The cottages also are well kept. Mr. Atkinson has made many improvements on the farm including the following—Covered fold yards, erected Dutch Barn, erected windmill for pumping water, piping and connecting to troughs at Moor House Farm. Mr. Atkinson is responsible for the upkeep of all buildings, &c., except for damage done by storm.

He is a keen farmer, a clever buyer, and makes full use of his large knowledge of farming in general and stock in particular.

FIRST PRIZE FARM IN CLASS IV.

Occupied by Mr. Arthur Green, Low House Farm, Silsden.

This farm is situated about half a mile from Steeton and Silsden station, and is held on a yearly tenancy under Lord

Hothfield, of Skipton Castle, Yorkshire. The farm consists of $11\frac{1}{2}$ acres arable, and $155\frac{1}{4}$ acres grass. The soil is of a good loam, with a subsoil of clay in most parts, and gravel in the remainder.

Mr. Green has only two arable fields, and generally grows a crop of oats, and a crop of turnips and mangolds alternately. In 1912 the cropping was as follows:—Oats, 5 acres; turnips and mangolds, 4 acres; potatoes, $2\frac{1}{2}$ acres. The turnip and mangold crop received 12 to 14 tons farmyard manure per acre. The grass land intended for hay receives 5 or 6 tons farmyard manure per acre. The pasture land has had no dressing for fifteen years, but Mr. Green feeds a lot of cattle in the summer, and uses a good deal of cake and meal.

The stock on the farm on our first visit consisted of two Shorthorn bulls (one pedigree, which won 3rd at Otley Show); four Shorthorn cows and heifers (all in calf); one Shorthorn bull calf (six months old); one Shorthorn heifer calf (eight months old); one yearling Shorthorn heifer; six milk cows; four cows feeding (almost beef); eight store cattle to feed summer 1912; six cows due to calve in January, February and May, 1912; two fat bullocks; two cows suckling calves, and two young calves to rear. Only three of the above cattle were bred on the farm.

In the summer Mr. Green has a stock of at least 100 feeding cattle, and in-calf cows, and usually, if an average summer, grazes two crops.

There were also on the farm on our first visit, 144 ewes in lamb (to commence lambing on January 9), and three rams. The ewes, with carriage, cost 265*l.* 0*s.* 10*d.*, and on our last visit had all been sold with their lambs for 597*l.* 12*s.* 8*d.*, leaving a profit of 332*l.* 11*s.* 8*d.*, less keep.

We also saw three heavy horses and one foal, and two light horses. Also sixteen pigs.

The cattle seen were of excellent quality; the cows looking like great milkers, and Mr. Green wins many prizes himself for milk cows. The sheep looked as if they had been well bought, and the return after lambing is a guarantee as to their quality and suitability for the district. The horses and pigs were all good sorts.

In winter, any cattle Mr. Green has, except milk-cows and feeding cattle, live on hay and turnips. The milk-cows get a mixture of chopped hay, oats, cotton cake, dried grains and bran, and a little bean or pea meal, about 7 lb. a day each, and hay. In summer, the feeding cattle get 6 lb. each of cotton-cake and dried grains, and the in-calf cows live on grass alone.

The ewes live on grass until a few weeks before they commence to lamb, and then Mr. Green gives them a mixture

of pulped turnips, split peas, and dried grains. The lambs are sold for fat, also the ewes, and a new flock is purchased each year.

Labour here costs about 30s. per acre, and purchased foods just over 450*l.* per annum, besides home-grown produce of an approximate value of 180*l.*, made up as follows:—40 tons of hay at 3*l.*, 120*l.*; and 120 tons of mangolds and turnips at 10s., 60*l.* No artificial manures are bought.

Mr. Green has been a tenant of the farm for twelve years, and his father had it before him for thirty years. He has built a new hall to his farm-house at his own expense, and done a lot of draining on the side of the river which borders several of his fields.

This farm is run in a very business-like manner indeed. The stock are all well bought, carefully attended to, and sold to good advantage. The farm-buildings are in excellent order, and well looked after. Hedges well trimmed. Pastures full of grand herbage, showing what an amount of cake has been given to the stock, as they have not had a dressing, as before stated, for fifteen years.

FIRST PRIZE FARM IN CLASS V.

Occupied by Mr. John Bell, Hagg Lane, Dunnington, York.

This farm is held on a yearly tenancy under Mr. J. H. Richardson, of Westfield, Acomb, York, and consists of 39 acres arable, and 10 acres grass.

The soil is very light, having a subsoil of sand.

The arable land is cropped on the following five course system:—turnips, barley or oats, seeds, potatoes, wheat, and the 1912 cropping was as follows:—Turnips, 4 acres; potatoes, 9 acres; seeds, 9½ acres (8 acres being clover, and 1½ acres rye-grass); wheat, 1½ acres; mangolds, 2 acres; carrots, 1 acre; oats, 8 acres; barley, 4 acres.

Mr. Bell does not do any catch-cropping, and as he is short of grass land, he buys what hay he requires at an average cost of 5*l.* per annum.

His pasture land receives what farmyard manure he can spare. The following quantities of artificial manure and farmyard manure are used for the different crops:—Turnips, 10 tons farmyard manure, and 6 cwt. artificial manure per acre; potatoes, 23 tons farmyard manure, and 7 cwt. artificial manure per acre; clover, 4 cwt. kainit, and 4 stone nitrate of soda per acre; ryegrass, none; wheat, 3 cwt. artificial manure per acre; mangolds, 15 tons farmyard manure, and 8 cwt. artificial manure per acre; carrots, 10 tons farmyard manure, and 5 cwt. artificial manure per acre; oats, small quantity artificial manure; barley, none.

The stock on the farm consisted of :—

- 4 milk cows (purchased).
- 10 young beasts for feeding (bred on the farm).
- 4 horses (3 purchased, 1 home bred).
- 12 pigs (bred on the farm).
- 46 feeding hoggs (purchased as lambs, at 21s. each).

In winter, the cattle receive roots, meal, cake, and straw, and in summer, cake. In winter, the horses receive rolled oats and clover hay.

Carrots are dug and cleaned, piece-work, at a cost of 7*l.* 6*s.* per acre. Labour costs 60*l.* a year, independent of Mr. Bell's personal labour. Meal and cake amount to nearly 70*l.* a year, besides which about 40 quarters of oats and other corn grown on the farm are consumed.

Mr. Bell purchases over 100 tons of horse and cow manure each year, as well as nearly 50*l.* worth of artificial manures.

This is as well-managed a small farm as could possibly be found. Stock of good quality, farm-house and buildings tidy, land in good heart, and not a bit of dirt to be found anywhere. The judges had no hesitation in awarding the first prize to Mr. Bell.

SECOND PRIZE FARM IN CLASS III.

Occupied by Messrs. T. & W. Hunter, Cowside, Settle.

This holding is divided into three farms, one at Darnbrook, Malham Moor, which consists of 1,100 acres pasture, and 1,880 acres fell ; one at Cowside, which consists of 300 acres, half of which is owned by Messrs. T. & W. Hunter, and the other half by the Exors. of W. Hunter ; and one at Winskill, which consists of 458 acres of rough enclosures and fell.

The farm at Darnbrook is held on a yearly tenancy under Mr. W. Morrison, of Malham Tarn, Longcliffe, Settle, and the one at Winskill on a yearly tenancy under Colonel Dawson, of Harlington Hall, Skipton. There is no arable land on the holding, and none of the ground has been ploughed for the last fifty years. The farms are from two to nine miles from Settle station, and are at an altitude of from 800 to 2,000 feet above the sea-level.

In 1912, hay was taken from 180 acres, and the remainder is permanent pasture and fell land.

The grass land for hay receives farmyard manure twice in three years. Half of the land for hay, which does not receive farmyard manure, is covered with basic slag, and where the ground is very dry, the slag is mixed with an equal weight of kainit ; the other half is covered with lime, which the competitors find answers best.

About 1,000 tons of lime, and about 50 tons of basic slag, some of it mixed with kainit, have been put on the Cowside farm. The lime is burnt on the farm.

About 5 tons per acre of farmyard manure is put on the grass land intended for hay, and about 7 cwt. where slag is used.

The following cattle were seen at the different farms :—

Cowside and Winskill. Fifteen calves ; ten two-year-old heifers ; five off-lying heifers ; fourteen off-lying cows ; ten milk cows (all first calf) ; two yearling bulls ; twenty-five Galloway bullocks ; four Highland bullocks. These cattle were all Shorthorn or Shorthorn crosses, except the Galloway and Highland bullocks, and were all bred on the farms except nine. *Darnbrook.*—Twelve calves ; sixteen yearling heifers ; nine calving heifers ; fifteen off-lying cows ; twelve milk cows (eight first calf) ; one yearling bull ; twenty-five Highland heifers. These were all Shorthorn and Shorthorn crosses, except the Highland heifers, and all, except eight, were bred on the farms.

We also saw the following sheep :—550 Black-faced lambs ; 630 half-bred lambs ; five Wensleydale lambs ; 240 Black-faced gimmer hogs ; 100 half-bred gimmer hogs ; 130 Yelt sheep ; 550 Black-faced ewes (shearlings and two shears), with Black-faced lambs ; 580 Black-faced ewes (three and four shears), with half-bred lambs ; eighteen Wensleydale rams, three Wensleydale ewes, two Wensleydale shearling gimmers ; twenty Scotch rams ; and forty Scotch Black-faced gimmer hogs. All these sheep, except sixty, were bred on the farms, the forty last-named being bought to make up the full number of that age. There were also twelve horses (eight of them bred on the farms).

The milk cows get Driffield Union Cake once a day in summer, and in winter the same cake one end of the day, and linseed and cotton cake, mixed, at the other end. The calves get meals and milk until they are about nine months old, then a little cake for the next six months, if it is winter. The heifers calving in spring get cake for two or three months before calving, according to the quality of the hay. The other cattle get nothing but hay. The out-liers get nothing, except when there is snow on the ground, when they have hay. The sheep get nothing, unless it is one that has not stood the severe winter. The cattle were of remarkably good quality, more especially considering the altitude of the land, and the horses very suitable.

The sheep were a great credit to the competitors, who have evidently spent considerable time and thought on their breeding and management.

The following are the piece-work prices on the farm :— Stone-walling, 1s. 3d. per yard, 5 ft. 6 in. high ; tile draining, 10d. to 1s. per rood ; stone draining, 1s. 6d. per rood.

Labour here amounts to 300*l.* per year. All the servants live in, and have board and lodging in addition. Purchased foods cost about 340*l.*, and artificial manures about 60*l.*

The Hunter family have been at Cowside for seventy-six years, Darnbrook seventeen years, and Winskill twelve years.

The homesteads are all very tidy and in good repair, and many improvements have been made by the competitors during their tenancy.

SECOND PRIZE FARM IN CLASS IV.

*Occupied by Mr. Thomas G. Green, Court Green Farm,
Cloughton.*

This farm lies a few miles from Scarborough, and about a quarter of a mile from Cloughton station. It is held on a yearly tenancy under Mr. H. E. Donne, of Court Green, Cloughton, and consists of 36 acres arable, and 86 acres grass. The soil is a good, rich loam, with a clay subsoil.

The arable land is cropped on the following four course system : turnips, barley, clover, oats, and in 1912 the cropping was as follows :—Roots, 10 acres ; barley, 7½ acres ; oats, 10 acres ; wheat, 1 acre ; clover, 7½ acres.

The tenant is responsible for the upkeep of fences, gates, and roads, but not for the buildings or drainage.

The grass land intended for hay receives farmyard manure and basic slag in alternate years. The grass land intended for pasture receives liquid manure, basic slag, lime, and farmyard manure. The pastures here were some of the best we saw in the competition, and highly suitable for the production of milk, which is Mr. Green's chief source of income. He retails milk in Scarborough at 1s. 4d. per gallon, besides which, he has several contracts.

The different crops receive the following quantities of artificial and farmyard manures per acre :—Swedes, 12 tons farmyard manure, and 5 cwt. nitrophosphate ; mangolds, 20 tons farmyard manure, and 6 cwt. mangold manure ; cabbage, 20 tons farmyard manure, and 2 cwt. nitrate of soda ; barley receives no manure. The clover receives no manure ; the first crop is made into hay, and the second crop is eaten on with lambs, which are trough fed. The clover ley receives 10 tons of farmyard manure per acre, and is drilled with oats.

The stock on the farm consisted of :—

Three farm horses (all mares), two bred on the farm ; two yearling heavy horses and a foal (all bred on the farm) and

two milk horses; thirty milk cows (two bred on the farm); one Shorthorn bull (bought); seven in-calf heifers (all home bred); and nine calves (bred on the farm).

Ninety-six pigs (all bred on the farm but three).

Seventy-one pure-bred Leicester sheep, and two Leicester rams (all home bred, except the rams); 150 head of home bred poultry.

The milk cows when in full milk receive 1 cwt. cut swedes with oat-chaff, and 3 lb. pea-meal mixed up together, and fed twice a day, together with 7 lb. best Egyptian cotton cake, and as much meadow hay as they will eat. In summer, the cows go out to grass, and have 4 lb. Bombay cotton cake with meadow hay at milking times.

The yearlings receive 4 lb. cotton cake, turnips, and straw.

The calves get all the milk that can be spared, until they are a month or six weeks old, then they receive calf meals, linseed cake, hay, and swedes.

The working horses have a stone of oats, and all the clover hay they will eat.

The milking cows looked very nice deep-milking sorts, and the shippens and dairy were kept in a very clean and airy condition. The pigs and sheep were all in good condition, and looked like going on well.

There is no piece-work done on the farm. Labour here costs between 34s. and 35s. per acre, purchased foods just over 480l. per annum (besides home-grown oats, barley, and wheat, to the approximate value of just over 180l.), and artificial manures nearly 40l.

The farm buildings are compact, and in a good state of repair. The land is in very good heart, and the walls are all in excellent order. The farm is very well suited for the purpose of milk producing, and is carefully managed by Mr. Green.

SECOND PRIZE FARM IN CLASS V.

Occupied by Mr. W. Asquith, Womersley Grove, near Pontefract.

This holding consists of $24\frac{1}{2}$ acres arable and 23 acres grass and is held on a yearly tenancy under the Rev. L. H. Blakeston, of Womersley, Pontefract. It is situated about a mile from Womersley station.

The soil and subsoil vary considerably, especially for such a small holding, the subsoil being sand in some fields and blue clay in others.

The arable land is cropped on the West Riding four-course system as follows:—Turnips or mangolds, barley, clover, wheat or oats.

The following was the acreage of the various crops :—
Turnips, 4 acres ; mangolds, 2 acres ; barley, 6 acres ; red clover and rye-grass, 6 acres ; wheat, $6\frac{1}{2}$ acres.

The grass land intended for hay receives farmyard manure and basic slag, and the pasture land basic slag.

Turnips and mangolds receive 15 tons farmyard manure and 5 cwt. hen and pigeon manure per acre.

The clover ley receives 20 tons farmyard manure for wheat.

The summer fallow after red clover receives 5 tons farmyard manure per acre for wheat.

The stock consisted of :—

Sixteen cattle, made up as follows :—four milk cows (home bred), six heifers and one steer, one year old and above (five bred and two purchased), five heifer calves (three bred and two purchased).

Twenty pigs—three sows (two bred and one purchased), two gilts (bred), one boar (purchased), and fourteen small pigs (bred).

Two work horses (one bred and one purchased) and one cart filly rising two year old (bred).

The horses in winter receive chopped straw, meal and clover ; and chopped straw, meal and grass in summer. The milk cows have chop meal and turnips twice a day, and cake at noon with as much hay as they can eat. The young cattle get turnips and straw, and the calves milk with a few turnips, and a little meal, hay and cake.

Labour here amounts to between 12s. and 13s. per acre, Mr. Asquith doing most of the work himself. There is no piece work done on the farm. Purchased foods cost nearly 70*l.* per annum.

This is a very creditable small holding and Mr. Asquith works very hard on it and makes the most of a not very favourable farm. Everything is clean and tidy and the land is in good heart.

JAMES BAINBRIDGE.

Walton House,
Warrington.

We subscribe to the foregoing Report—

GEORGE HARRISON.
G. G. REA.

REPORT OF THE COUNCIL TO THE
ANNUAL GENERAL MEETING OF GOVERNORS
AND MEMBERS OF THE SOCIETY,

HELD AT THE ROYAL AGRICULTURAL HALL, ISLINGTON, N.,
On WEDNESDAY, December 11, 1912, at 3 p.m.

LORD MIDDLETON (President) in the Chair.

The Council have to report that the list of Governors and Members has undergone the following changes during the year which has elapsed since the Annual General Meeting on December 6th, 1911: 5 new Governors and 589 new Members have joined the Society, and 4 Members have been re-instated under By-law 14; whilst the deaths of 3 Life Governors, 3 Governors, 2 Honorary Members, 91 Life Members, and 186 Annual Members have been reported. A total of 22 Members have been struck off the books under By-law 12, owing to absence of addresses; 67 Members under By-law 13, for arrears of subscription; and 2 Governors and 221 Annual Members have resigned.

2. During the past year, the losses by death sustained by the Society include one Member of the Council (Mr. George Taylor) and three ex-Councillors (Mr. William Scoby, Mr. Alfred J. Smith, and Lord Wenlock, G.C.S.I.). Mr. George Taylor, who died on the 26th August after a long illness, had represented the Division of Middlesex on the Council since the year 1905. He was a past president of the Shorthorn Society, and as a breeder of Dairy Shorthorns he had made for himself a reputation not only at home but also in many other parts of the world. Mr. William Scoby, a prominent Yorkshire agriculturist, and breeder of horses and Shorthorn cattle, who passed away in October last, had represented the North Riding of Yorkshire. He joined the Council in 1901, and continued a member of that body until the end of last year, when, on account of failing health, he decided not to seek re-election. Mr. Alfred J. Smith, who died in October, at the age of 77, was another well-known personage in the agricultural world. Mr. Smith had been on the Council for upwards of 20 years, when, in 1907, owing to advancing years, he decided to retire, and his place was taken by his son. Mr. Alfred Smith farmed on the Rendlesham Estate for half-a-century, and achieved fame as a breeder of Suffolk horses, Red Poll cattle, and Suffolk sheep. The late Lord Wenlock, whose decease took place early in the year, became a Member of the Society in 1881, and served on the Council from 1902 to 1905.

3. Amongst other Governors and Members whose loss by death, since the last Annual Meeting, the Society has to deplore, are the Marquis of Hertford (Gov.), the Earl of Euston, Earl Ferrers, Viscount Gage, Viscount Peel, Lord Calthorpe, K.C.B., Lord Furness (Gov.), Lord Llangattock (Gov.), Lord St. John, Lord Stalbridge, Lord Wandsworth, Lord Waterpark (1865), The

Right Hon. Sir A. Otway, Bart., The Right Hon. J. Lloyd Wharton, Captain the Hon. R. Allsopp, the Hon. J. Ashburnham, the Hon. Charles Brand, Hon. William Lowther, Sir Reginald P. Beauchamp, Bart., Sir John Whittaker Ellis, Bart., Sir W. H. B. Ffolkes, Bart., K.C.V.O., Sir W. M. Honyman, Bart., Sir H. D. Ingilby, Bart., Sir F. S. Powell, Bart., Sir Julius C. Wernher, Bart. (Gov.), Sir Bosdin T. Leech, Sir Horace Regnart, Sir Thomas Skewes-Cox, Sir George White, M.P., Major-Gen. Sir Mildmay Willson Willson, K.C.B., Count Arnim-Schlagenthin, Baron William Von Schroder, Dr. Giovanni Carlo Siemoni (Hon. Member), Mr. A. H. Ashdown, Mr. W. Thorney Ayre, Mr. T. H. Bainbridge, Mr. Francis P. Baker, Mr. A. C. Bamlett, Mr. T. Bannister, Mr. C. A. Barnes (1860), Mr. William Beckett, Mr. R. B. Brockbank, Mr. Isaac A. Brown, Mr. C. J. Bruce (Auchenzeoch), Mr. J. Burdon Sanderson, Mr. E. C. Atherton Byrom, Mr. C. C. Calverley (1845), the Rev. L. Capel Cure, Mr. Archibald Coats, Mr. Frank G. Debenham, Mr. Carl Eder, Mr. C. A. Egerton, Major W. H. Fife-Cookson, Mr. E. France-Hayhurst, Mr. F. B. Frank (1865), Mr. Thomas Fry (1857), Mr. William Garnett (1858), Mr. H. J. Garrod, the Very Rev. Dr. Gillespie, Colonel T. L. Hampton Lewis, Mr. R. Donne Hancock, Captain W. B. Harrison, Mr. W. D. James, C.V.O. (Gov.), Major W. J. Joicey, Mr. George Lewthwaite (1865), Mr. J. Knox Lyal, Mr. Andrew Montgomery, Mr. George Nevile (1855), Mr. William E. Oakeley, Mr. H. C. Okeover, Mr. W. Fillingham Parr, Mr. Percy Percival, Mr. C. D. Phillips, Mr. H. M. Proctor, Mr. Robert Ratcliff, Mr. J. Maunsell Richardson, Mr. F. Riley-Smith, Mr. George F. Roumieu, Mr. P. Saltmarshe (1885), Mr. William Sherborn, Mr. W. Barrow Simonds (1839, Foundation Life Governor), Mr. R. S. Wilnot Sitwell, Mr. Henry Straker (1868), Mr. E. S. Trafford, Lieut.-Col. C. A. M. Warde, Professor Thomas Winter, Mr. Horace Wolton, and Mr. Rowland Wood.

4. The above, and other changes, bring the total number of Governors and Members now on the Register to 10,307, divided as follows:—

- 170 Annual Governors ;
- 86 Life Governors ;
- 7,274 Annual Members ;
- 2,748 Life Members ;
- 29 Honorary Members ;

10,307 Total number of Governors and Members, as against a total of 10,306 Members on the Register at the time of the last Annual Report.

5. Mr. Kenneth J. J. Mackenzie having, owing to ill-health, felt it necessary to resign, the Council, in April last, appointed Mr. C. S. Orwin, School of Rural Economy, Oxford, as Editor of the Journal.

6. The Members of Council who retire by rotation at the next General Meeting are those representing the Electoral Districts of Group "C." The necessary steps are being taken for the election or re-election of Representatives for the various Divisions concerned. As the number of Governors and Members

resident in the Electoral District of the West Riding of Yorkshire on the 1st August last was 367 that Division is now entitled, under By-law 83, to elect another Representative in addition to Mr. Stanyforth. Owing to the recent death of Mr. George Taylor, a vacancy has occurred in the representation of Middlesex, and all the electors in this Division have been notified with a view to the vacancy being filled up.

7. The Earl of Northbrook having intimated that he would be prepared to accept nomination as President of the Society for the year 1913, the Council have unanimously decided to recommend the election of his Lordship to that office at the Annual Meeting.

8. In accordance with the By-laws, the balance-sheet has to be presented for consideration at the Annual General Meeting. The Council therefore beg to submit the balance-sheet for the year 1911, with the Statement of Ordinary Income and Expenditure. These accounts were published in Volume 72 of the Journal issued to Members early this year, having been duly examined and certified as correct by the Auditors appointed by the Members, and by the professional Accountants employed by the Society.

9. The Annual Exhibition at Doncaster this year—which it was generally agreed would have been one of the best ever held—was to a very large extent marred by the compulsory abandonment, at the last moment, of the Cattle, Sheep and Swine sections. Though the outbreaks of foot-and-mouth disease reported during the week preceding the Show had caused the Officials much anxiety and had led to extraordinary precautions being taken in the veterinary examination of animals before admission to the Showyard, it was not until the morning of Monday, July 1st (the day preceding the opening of the Show), that an intimation was received by telegram from the Board of Agriculture to the effect that an Order was being made prohibiting the exhibition of Cattle, Sheep and Pigs. This prohibition involved no less than 2,249 entries, nearly 1,500 of which were actually in the Showyard, and many others were in transit. Arrangements were made immediately with the railway companies to get the banned exhibits away at the earliest possible moment; and so well was the work carried out that by the time the gates were opened at 8 o'clock on the Tuesday morning, almost every entry in the prohibited sections had been despatched from the Show.

10. Fortunately for the Society there were still left in the Showground many things to attract and interest the visitor, including the fine display of Implements and Machinery, the Working Dairy, the Horticultural, Forestry and Agricultural Education Exhibitions, the excellent entries of Horses, Poultry, and Produce, and the Championship Show of the National Terrier Club.

11. With the Cattle, Sheep and Pigs all sent away, the troubles of the Show Officials were, however, by no means at an end, for the first day's proceedings took place in the midst of a perfect deluge. So bad, indeed, was the rain in the morning

that the Honorary Director felt it necessary to postpone the judging of the Horse classes until the afternoon. At this period the outlook for the Show was as gloomy as it could possibly be, and the "black Tuesday" in the history of the Royal will not easily be forgotten by those who were present that day in the Doncaster Showyard.

12. Notwithstanding the combination of adverse circumstances at the beginning, brighter conditions prevailed later, and, everything considered, the attendance of 90,139 persons during the week must be regarded as satisfactory.

13. At a specially convened meeting on the Tuesday, the Council expressed their concurrence, under the circumstances, with the action taken by the Board of Agriculture in prohibiting the Cattle, Sheep and Pig portions of the Show, and decided to refund the fees paid for the entries of the animals concerned.

14. On the Wednesday the Show was visited by H.R.H. Prince Arthur of Connaught, who travelled down from London, arriving at the Showyard about 1.30 p.m., where he was received by the President and Council. Having lunched in the Royal Pavilion as the guest of the President, His Royal Highness made a detailed inspection of the various exhibits and spent some time in the Royal Box at the Grand Stand watching the horse jumping competitions and other events in the Large Ring.

15. During the preliminary preparations and also at the Show itself the Society received the most cordial support from the Local Committee and from both the Yorkshire and the Doncaster Agricultural Societies. The greatest assistance also was rendered throughout by the Mayor (Mr. Councillor Clark) and the Corporation of Doncaster, whose courtesy and hospitality were recognised at the General Meeting of Governors and Members in the Large Tent on the Thursday. On that occasion thanks were also tendered to the railway companies, whose help under the most exceptional difficulties was acknowledged on all hands.

16. In view of the inevitable loss which would be sustained, many exhibitors in the Cattle, Sheep and Pig sections generously expressed their intention not to receive back the entry fees which the Council had decided to return, and these, in addition to contributions, amounted in all to £290 2s. 0d.

17. The Accounts of the Show have now been prepared, and, subject to audit, these disclose a deficit of £1,232 11s., to meet which, however, there is the £2,500 set apart from the ordinary account as a contribution to the Show Fund.

18. A Trial of Corn and Seed Drills was carried out by the Society in April last at the farm of Mr. C. D. Nicholson, of Stainton Manor, Rotherham. For the purpose of the trials the machines were divided into two classes:—

Class 1. Drills for Corn and Pulse; First Prize, £10; Second Prize, £5 (8 entries).

Class 2. Drills for Grass and Clover, coulter and broadcast; First Prize, £10; Second Prize, £5 (one entry).

The First and Second Prizes in Class I. and the First Prize in Class II. were awarded to Messrs. Francis Walker and Sons, of

Tithby, Bingham, Notts, Messrs. Kell and Company, Limited, Gloucester, being Highly Commended in Class I.

19. The Society's Seventy-fourth Annual Exhibition will be held from Tuesday, the 1st, to Saturday, the 5th July, 1913, on the Clifton and Durdham Downs at Bristol. A special attraction of this Show will be a section, comprising a space of about two acres, devoted exclusively to exhibits of the natural produce of the British Dominions Oversea.

20. The Schedule of Prizes for Live Stock, Poultry, Produce, etc., at the Bristol Show, which will be issued early in the new year, will be on a very liberal and comprehensive scale. The Bristol Local Committee have promised a handsome contribution towards the prizes, and offers of Champion and other prizes have been received from the following Breed Societies:—Shire Horse Society, Clydesdale Horse Society, Suffolk Horse Society, Hunters' Improvement and National Light Horse Breeding Society, Hackney Horse Society, Polo and Riding Pony Society, Shetland Pony Stud Book Society, Shorthorn Society, Dairy Shorthorn (Coates' Herd Book) Association, Lincolnshire Red Shorthorn Association, Hereford Herd Book Society, Devon Cattle Breeders' Society, Longhorn Cattle Society, Sussex Herd Book Society, Welsh Black Cattle Society, Aberdeen Angus Cattle Society, English Aberdeen Angus Cattle Association, British Holstein Cattle Society, English Jersey Cattle Society, English Guernsey Cattle Society, Southdown Sheep Society, Hampshire Down Sheep Breeders' Association, Suffolk Sheep Society, Dorset Down Sheep Breeders' Association, Dorset Horn Sheep Breeders' Association, Lincoln Long Wool Sheep Breeders' Association, Leicester Sheep Breeders' Association, Society of Border Leicester Sheep Breeders, Kent or Romney Marsh Sheep Breeders' Association, Cotswold Sheep Society, Devon Long Woolled Sheep Breeders' Society, Exmoor Horn Sheep Breeders' Association, Breeders of Cheviot Sheep, Lincolnshire Curly Coated Pig Breeders' Association.

The following Challenge Cups are also offered:—

£50 Silver Cup for the best Suffolk Stallion.

Fifty Guinea Gold Cup for the best Hunter Riding Mare or Gelding.

Fifty Guinea Gold Cup for the best Hack or Riding Pony.

Fifty Guinea Gold Cup for the best Single Harness Horse in the Novice Classes

Fifty Guinea Gold Cup for the best Single Harness Horse.

Fifty Guinea Gold Cup for the best Pair of Harness Horses.

Fifty Guinea Gold Cup for the best Tandem.

Fifty Guinea Gold Cup for the best Four-in-Hand.

Fifty Guinea Cup for the best group of Dairy Shorthorns.

£20 Silver Cup for the best animal in the South Devon Cattle Classes.

£15 Silver Cup for the best Longhorn Bull or Cow.

£15 Silver Cup for the best Longhorn yearling Bull or Heifer.

Twenty-five Guinea Silver Cup for the best animal in the Kerry Classes.

Twenty-five Guinea Silver Cup for the best animal in the Dexter Classes.

Fifty Guinea Silver Bowl for the best group of Lincoln Sheep.

Sixty Guinea Silver Cup for the best Border Leicester Ram or Ewe.

Twenty Guinea Silver Cup for the best Large Black Sow.

In the Poultry section Prizes amounting to £416 are offered in 136 classes, and the following are providing special Prizes: The White Plymouth Rock Club, the Croad Langshan Club, the Sussex Poultry Club, the Malines Poultry Club, the Campine Club, and the Orpington Duck Club.

The Horticultural Exhibition in the Showyard at Bristol will be opened on Tuesday, July 1st, and will close on Friday, July 4th. Money Prizes and Gold, Silver and Silver Gilt Medals will be offered in 19 classes.

The National Terrier Club will hold their Show in the Showyard on the Thursday and Friday, July 3rd and 4th.

An Agricultural Education and Forestry Exhibition will be held in the Bristol Showyard on the same general lines of those of previous years.

The Plantations and Nurseries Competition—to be organised in conjunction with the Royal English Arboricultural Society—will next year be restricted to the counties of Somerset, Devon, Cornwall, and Monmouth.

21. The following Prizes for Farms, amounting in all to £500, are offered by the Bristol Local Committee:—

For the best managed Farms in Gloucestershire.

Class I.—FARM of 250 acres or over, exclusive of Down. First Prize, £80; Second Prize, £40. (5 entries.)

Class II.—FARM of not less than 50 acres and under 250 acres, exclusive of Down. First Prize, £50; Second Prize, £30. (3 entries.)

For the best managed Farms in Somersetshire and Dorsetshire.

Class III.—FARM of 300 acres or over, exclusive of Down. First Prize, £80; Second Prize, £40. (7 entries.)

Class IV.—FARM of not less than 150 acres and under 300 acres, exclusive of Down. First Prize, £80; Second Prize, £40. (11 entries.)

Class V.—FARM of not less than 50 acres and under 150 acres, exclusive of Down. First Prize, £40; Second Prize, £20. (6 entries.)

Entries in these Classes closed on Friday, November 1st.

22. The following Prizes are offered for Milking Machines:—First Prize, £25 and gold medal; Second Prize, £10 and silver medal. Entries must be sent in on or before 1st February next, and the trials will take place in the County of Durham in April or May, 1913.

23. Prizes of £10 and £5 will also be offered in connection with the Bristol Show next year, for Hand-power Machines for applying Dry Insecticides or Fungicides in powder form to bushes and trees.

24. Invitations have been received and accepted by the Society for the holding of future Shows as follows:—In 1914, at Shrewsbury; in 1915, at Nottingham; in 1916, at Manchester; in 1917, at Cardiff.

25. At midsummer, Dr. Voelcker transferred his laboratory from No. 22 to No. 1, Tudor Street, E.C., which latter will, in future, be the address of the Society's Laboratory, and to which samples and communications should be sent. About the same number of samples were submitted for analysis

as during the preceding twelve months, this being 426. Special reference has been made, in the reports of the Chemical Committee, to Bombay cotton cake containing excessive sand, rice meal composed mainly of rice "shudes" (husks), barley meal adulterated with pea husks, and sharps adulterated with pea husks and containing an excessive amount of sand. In connection with the Society's Show at Doncaster, 36 samples of Cider were analysed, but, in consequence of the cancelling of the Cattle classes, there were no samples of Milk taken.

26. If 1911 was an exceptional season for the Society's Experimental Farm at Woburn, 1912 was equally so, though in a different direction. The wheat and barley crops, after looking well at first, failed to ripen properly, through the absence of sun and warmth and the influence of the persistent downpour experienced in August. At the Woburn Farm there were no less than 26 out of the 31 days of August on which rain fell. The wheat, which was cut early in the month, began to sprout in the shocks, and had to be threshed out at once, the barley, which was later and was left standing until September, fared, on the whole, rather better, but the quality was, as in many other districts, very inferior. Fortunately, the hay crop had been got in well and was a very fair yield. Root-crops also were excellent, these including experimental plots of sugar-beet. An interesting series of experiments on varieties of lucerne and on methods of sowing this crop was carried forward, the best results coming from Russian (Europe) lucerne, and then from Canadian and Provence seed. The plots sown on bare ground were uniformly better than those laid down in a barley crop. There were also trials with different varieties of wheat—including French wheats—and of barley. An experiment in the rearing of calves gave rise to much interest and, so far as it has gone, has shown the best results, as regards the animals, from the giving, in the early stages, of whole milk, or of crushed oats along with separated milk.

27. At the Pot-culture Station, the Hills' experiments have been carried further, lithium, zinc, and lead salts being the special subjects of enquiry. More work has been done on the influence of magnesia in soils, and on the heating and sterilising of soils.

28. During the season the Farm has been visited by parties from the Glamorganshire County Council, the Leicestershire Chamber of Agriculture, and the Tunbridge Wells Farmers' Club, as well as by many private individuals. On July 23rd, the annual visit of Members of the Society took place, about 50 Members joining in it, while on August 1st the Council made its official inspection of the Farm and Experimental Station.

29. On May 8th an influential deputation from the Council waited upon the President of the Board of Agriculture to urge upon him the claims of the Woburn Experimental Station for recognition under the Development Fund scheme. So far, however, no definite action has been announced.

30. Mr. W. H. Hogg, who has been the Manager of the Experimental Farm for the last eleven years, has resigned his post in consequence of his having obtained an appointment as

Inspector under the Scottish Board of Agriculture. Mr. Frank C. Atkinson, B.Sc., of Durham University, and now of the North-Eastern County School, Barnard Castle, has been appointed as the new Manager of the Farm.

31. The work of the Botanical Department during the past year has been of a very varied character. The earlier months of the year were, as usual, occupied with seed-testing and dealing with enquiries as to the best kinds of seeds for various purposes. In the early part of the summer many problems concerned with the management of meadow land were dealt with. The majority of these were traceable directly to the effects of the long continued drought of 1911. As a result of this, bare patches were found chiefly through the death of the clovers, which became invaded by colonies of annual grasses such as soft brome and various weeds. In some few cases pastures had suffered in the same manner though not to so marked an extent. Such patches should "heal" in a season or so if the annuals are prevented from seeding, but in one exceptionally bad case re-seeding had to be recommended. Weeds for identification were received in larger numbers than usual. Many of these were sent under the impression that they might be responsible for the death of sheep, but none of the species examined were known to be poisonous. Others were common perennial weeds which had obtained a hold in pastures chiefly through bad management in former years. The increasing recognition of the losses caused by fungoid parasites has led to numerous enquiries in this subject. The majority were concerned with the diseases of fruit trees, and in most cases simple curative or preventive measures could be suggested directly. In some few cases special investigations have had to be started with the aid, in most cases, of the Members sending the enquiries.

32. The work of this Department during the past year has, as usual, fallen under three heads:—The identification of a large number of insects and arachnids, interesting for one reason or another, the giving of advice in the case of insect attack, and the investigation of obscure points in the life history of pests. An unusual number of insects and arachnids have been sent for investigation, including many external parasites of animals. The insect attacks advised upon have included a few of an abnormal character, and have covered a wide field, comprising pests of farm crops, fruit, forest trees, and domestic animals. An enquiry was carried out into the utility of the "Ortel ferment," and into the life-history of several injurious insects. Renewed investigation of the raspberry beetle has brought new facts to light, and further discoveries have been made in connection with the pea thrips. As usual the peculiar weather conditions had a marked effect on the work of the season.

33. The outbreaks of anthrax confirmed by the Board of Agriculture during the year show a slight decline as compared with the previous year. The returns with regard to glanders continue to be satisfactory, but the progress towards complete extermination of the disease has been less rapid than during 1911. In the case of sheep scab there has been since the beginning of the year a most gratifying diminution in the number

of outbreaks. Unfortunately, judged by the number of reported outbreaks, swine fever has been even more prevalent during the current year than in 1911, which was in this respect the worst for many years past. The most serious feature of the year in connection with the occurrence of contagious disease has been the re-appearance of foot-and-mouth disease. After six months of apparent freedom from the disease four outbreaks were detected in the week ended 29th June, viz., two in Cumberland and two in Lancaster. Between that date and the 8th of October 78 outbreaks were discovered in different parts of the country, the counties involved in addition to the two mentioned being Chester, Durham, Northumberland, Surrey, East and West Riding of Yorkshire, Leicester, Somerset, Salop, Sussex, Stafford, and Hants. In these 82 outbreaks 636 animals were attacked. In view of the number and scattered character of the outbreaks the country may be regarded as having narrowly escaped a very great danger. The fact that the disease did not spread to a greater extent testifies to the efficiency of the measures adopted by the Board of Agriculture and Fisheries and to the wisdom of the stamping out policy as applied to outbreaks of this scourge.

34. At a Special Meeting of the Council held on the 8th October last, the following Resolutions were unanimously passed, and copies were ordered to be sent to the various Agricultural and Breed Societies and kindred bodies in Great Britain:

“That while desiring to express their approval of the action taken by the Board of Agriculture whereby the importation into Great Britain of Irish cattle was prohibited, the Council of the Royal Agricultural Society of England desire to place on record their regret at the action of the President of the Board of Agriculture in admitting Irish Store Cattle into this country at a time when cases of Foot-and-Mouth disease are reported from different districts in Ireland, thus opening the door to the re-introduction of disease from Ireland into Great Britain. They would urge upon him most strongly in the interests not only of the breeders and stock owners of this country, but of consumers, that the regulations lately existing should be re-imposed until such a time as Ireland is free from the disease.”

“That the Society join in the Deputation to be received by the President of the Board of Agriculture on Wednesday next, to present the Resolution passed at this meeting.”

On the 9th October the President of the Board of Agriculture received a very large and influential Deputation representing the Royal Agricultural Society of England, the Central and Associated Chambers of Agriculture, the National Farmers' Union, the Shorthorn and several other Breed Societies. The Deputation was introduced by the Right Hon. Henry Chaplin, M.P., and the views contained in the first resolution were put forward by the Duke of Devonshire, on behalf of the Society, and by speakers representing the other organisations. The Council regret that Mr. Runciman was unable to give effect to the views put before him by the Deputation.

35. Progress has been made during the year with the experiments which are being carried out at Woburn for the purpose of demonstrating that by means of isolation it is possible to rear healthy stock from tuberculous parents. It is hoped that the final report on the experiments will be ready some time next year.

36. As the result of the examination at the Royal Veterinary College for the Society's Medals for proficiency in Cattle Pathology, including the diseases of Cattle, Sheep and Pigs, the Silver Medal has been awarded to Mr. S. J. Gilbert, Royal Veterinary College, Camden Town, N.W., and the Bronze Medal to Mr. R. H. Knowles, of Strawberry Hill, Haulgh, Bolton.

37. As announced in the last report, the Council decided last year to offer the Society's Gold Medal annually for original research in Agriculture. Five Essays have been submitted by qualified candidates.

38. The Trustees of the "Queen Victoria Gifts" Fund have made a grant to the Royal Agricultural Benevolent Institution of £140 for the year 1912, to be distributed in grants of £10 each to the five male candidates, five married couples, and four female candidates, who polled the largest number of votes in their class, and who would not this year receive grants from any other fund in connection with the Royal Agricultural Benevolent Institution.

39. The Thirteenth Annual Examination for the National Diploma in Agriculture was held at the Leeds University from the 20th to the 26th April last, when thirty-two candidates were successful in obtaining the Diploma, the first four gaining Honours. For list see pp. 259 and 260.

40. The Examination for the National Diploma in Dairying was held this year for English students from September 14th to 20th, at the British Dairy Institute and University College, Reading; and for Scottish students from September 20th to 28th, at the Dairy School for Scotland, Kilmarnock. Forty-one candidates were examined at Reading, of whom twenty-three passed, and fifty candidates at Kilmarnock, of whom thirty-two passed. The names of the successful candidates will be found on pp. 264 and 265.

By Order of the Council,
THOMAS MCROW,
Secretary.

16 BEDFORD SQUARE,
LONDON, W.C.,
November 6, 1912.

NATIONAL AGRICULTURAL EXAMINATION BOARD.

I.—REPORT ON THE RESULTS OF THE THIRTEENTH EXAMINATION FOR THE NATIONAL DIPLOMA IN AGRICULTURE,

HELD AT LEEDS, APRIL 20 TO 26, 1912.

1. THE Thirteenth Examination for the NATIONAL DIPLOMA IN AGRICULTURE which, by the courtesy of the authorities, was held at the University of Leeds from the 20th to the 26th April last, marked a change in the principle of this Examination which has now been conducted annually since the year 1900.

2. New Regulations and a revised Syllabus came into force for the first time, under which a candidate was required to present a certificate from a recognised agricultural college that his attainments in the subjects of *General Botany, Geology, General Chemistry, Physics and Mechanics*, as attested by class and other examinations were, in the opinion of the authorities of his college, such as to justify his admission to the Examination; or to produce other evidence of equivalent attainment. The subjects of Examination were *Practical Agriculture (two papers), Farm and Estate Engineering* (including (a) Surveying, (b) Farm Buildings, (c) Machinery and Implements), *Agricultural Chemistry, Agricultural Botany, Agricultural Book-keeping, Agricultural Zoology, and Veterinary Science*.

3. Candidates were given the option of taking the whole *eight* papers at one time, or of sitting for a group of *any four* this year, it being understood that if these were passed the remaining group of four were to be taken next year. Candidates failing in a single subject of a group will be permitted to take this again in conjunction with the second group.

4. After the issue of these new Regulations, however, it came to the knowledge of the Board that a substantial number of students would be unable to comply with the new requirements. To meet such cases, it was found necessary, therefore, to hold an Examination in both Part I. and Part II. under the conditions which had been in force hitherto.

5. In all 102 candidates presented themselves, 21 in Part I. (*old* Regulations), 43 in Part II. (*old* Regulations), and 38 under the *new* Regulations.

6. Of these last-mentioned 38, four took the whole Examination, three being successful in obtaining the Diploma. Of the 34 sitting for a group of four subjects, 23 were successful.

7. Of the 43 candidates who entered this year for Part II. (*old Regulations*)—which comprised the subjects of Practical Agriculture, Agricultural Book-keeping (*or Mensuration and Land-Surveying*), Agricultural Chemistry, Agricultural Engineering, and Veterinary Science—four, who had previously failed in one subject of Part I., were allowed to take that subject *in conjunction* with the Second Part; and seven who had on a former occasion failed in only one subject of Part II., came up for that subject *alone*.

8. The result of the Examination in Part II. was that 29 candidates (including two of the four who were also taking a Part I. subject, and the whole seven who came up for one subject only) were successful, and, having passed both Parts of the Examination, were awarded the National Diploma in Agriculture, the first four candidates obtaining Honours.

9. In the list which follows the names of the candidates gaining Honours are given in order of merit, and the other Diploma winners in alphabetical order, the three who were successful under the new Regulations being marked with an asterisk.

Diploma with Honours.

1. JOHN MALCOLM, West of Scotland Agricultural College, Glasgow.
2. JAMES FITZGERALD MALCOLM, West of Scotland Agricultural College, Glasgow.
3. ARTHUR RICHARD WESTROP, Harper-Adams Agricultural College, Newport, Salop.
4. EDWARD PERCIVAL, Harris Institute, Preston.

Diploma.

- WILFRED PEASE BARKER, University of Leeds
 DOUGLAS JACKSON BOYLE, University of Leeds.
 HAROLD BRADSHAW, Harris Institute, Preston.
 BENJAMIN BROWNE, Jun., The Boot, Windermere.
 *WILLIAM THOMAS CLARKE, University College, Reading.
 GEORGE HAMPDEN CRABTREE, Harris Institute, Preston.
 ALEX G. G. ELLIS, North of Scotland College of Agriculture, Aberdeen.
 VICTOR C. FISHWICK, Beds. Agricultural Institute, Ridgmont.
 GILBERT ALEXANDER GOODY, Agricultural College, Uckfield, Sussex.
 JOHN ANGUS GUNN, West of Scotland Agricultural College, Glasgow.
 GUY RHODES HAIGH, University of Leeds.
 REGINALD WATT HUNTER, University of Leeds.
 JAMES KIRKWOOD, West of Scotland Agricultural College, Glasgow.
 JOHN KIRKWOOD, West of Scotland Agricultural College, Glasgow.
 ANDREW CORRIE MCCANDLISH, West of Scotland Agricultural College, Glasgow.
 MAURICE MALCOLM, West of Scotland Agricultural College, Glasgow.
 *ALEXANDER MURRAY, West of Scotland Agricultural College, Glasgow.
 CYRIL HERBERT PAGE, Harper-Adams Agricultural College, Newport, Salop.
 ERNEST PENNINGTON, Harris Institute, Preston.
 JOSEPH HENRY PRATER, Halwyn Farm, Crantock, Newquay, Cornwall.
 A. EWING REID, West of Scotland Agricultural College, Glasgow.

WILLIAM ROBB, West of Scotland Agricultural College, Glasgow.

ARNOLD ROEBUCK, Fixby, Brighthouse.

ALEXANDER FRANCIS SMITH, University of Aberdeen.

GEOFFREY BELASYSE SMITH, University of Leeds.

H. WILBERFORCE THOMPSON, University of Leeds.

ALEC D. R. WALBANK, University of Leeds.

*B. LIONEL WOLF, Agricultural College, Uckfield, Sussex.

PART I.

Of the 21 candidates who sat for Part I. (*old Regulations*) the following eight were successful and are entitled to present themselves for Part II. in 1913 :—

GILBERT HENRY BROOKE, University of Leeds.

GEORGE T. FINDLAY, North of Scotland College of Agriculture, Aberdeen.

CHARLES WILLIAM GOODE, University of Leeds.

ARTHUR KING, University of Leeds.

HAROLD MARSHALL, University of Leeds.

HENRY ROEBUCK, University of Leeds.

ALBERT WATSON, University of Leeds.

GEORGE WHITTAKER, Harper-Adams Agricultural College, Newport, Salop.

NEW REGULATIONS.

10. The following 23 candidates were successful in passing in the four subjects for which they sat at the recent examination, and will therefore be permitted to take the remaining four subjects next year :—

ALFRED C. CAMPBELL, West of Scotland Agricultural College, Glasgow.

STEPHEN M. CHERRIE, West of Scotland Agricultural College, Glasgow.

JAMES COCHRANE, West of Scotland Agricultural College, Glasgow.

RICHARD B. COMELY, Royal Agricultural College, Cirencester.

FINLAY ROSS CORRIE, West of Scotland Agricultural College, Glasgow.

THOMAS GILLILAND, West of Scotland Agricultural College, Glasgow.

JAMES BUTLER GODDARD, Harris Institute, Preston.

THOMAS R. HEWITT, Royal College of Science, Dublin.

HAROLD EDWIN HIPPLEY, Royal Agricultural College, Cirencester.

ALBERT BENTLEY HYDE, Harris Institute, Preston.

RICHARD IBISON, Harris Institute, Preston.

WILLIAM KIRKPATRICK, West of Scotland Agricultural College, Glasgow.

WILFRID McLEAN, Royal College of Science, Dublin.

THOMAS B. MANSON, West of Scotland Agricultural College, Glasgow.

THOMAS L. MASHETER, Harris Institute, Preston.

WILLIAM D. MONTGOMERIE, West of Scotland Agricultural College, Glasgow.

JOSÉ PEDEN, West of Scotland Agricultural College, Glasgow.

JOHN DARE POWELL, Harper-Adams Agricultural College, Newport, Salop.

PERCIVAL JOHN POWELL, Midland Agricultural & Dairy College, Kingston, Derby.

LINDSAY ROBE, West of Scotland Agricultural College, Glasgow.

JOHN HEPBURN RUSSELL, West of Scotland Agricultural College, Glasgow.

SIRDAR DARSHAN SINGH OF VAHALI, Royal Agricultural College, Cirencester.

JOSEPH SHEPHERD TOWERS, Harris Institute, Preston.

11. The Reports of the Examiners in the various subjects are as follows :—

AGRICULTURAL BOTANY. Professor John Percival, M.A., F.L.S.

Old Regulations (Part I.), 200 Marks. New Regulations, 300 Marks.

A great many of the candidates sent up for the examination under the *old regulations* had very little knowledge of their subject, and should not have entered.

On the other hand those entering under the *new regulations* (which ought to, and apparently do, secure a better training before sitting for the examination) were of superior merit, their work reaching a considerably higher average standard than in any previous examination.

In regard to particular questions the only points worth noting were the tendency of several candidates to confuse the problem of "nitrogen fixation" with the totally different question of "nitrification," and a certain weakness in describing the botanical characters of farm plants.

MENSURATION AND LAND SURVEYING. Mr. R. E. C. Burder, P.A.S.I.

Old Regulations, 200 Marks.

The papers submitted in this subject maintained a fair average standard, but I do not consider that any of them could be described as being in any way exceptionally good. The style of the plans and sections was very much the same as last year, and greater neatness and definition is still very desirable.

FARM AND ESTATE ENGINEERING. Mr. R. E. C. Burder, P.A.S.I.

(Surveying and Farm Buildings); Mr. Arnold G. Hansard, B.A., M.Inst.E.E.
(Machinery and Implements).

New Regulations, 300 Marks.

The remarks made with reference to the papers in Mensuration and Land Surveying apply equally to the Surveying portion of this examination. In the Building section the candidates showed that they had been carefully instructed in the subject of land drainage, but in many cases their answers indicated that they had failed to consider sufficiently the exact conditions laid down in the question. The candidates appeared to possess a very fair knowledge of plan drawing and of the dimensions required for the different descriptions of buildings, but they were ill prepared on the subject of cost and values, the answers given to the second portion of question 6 being very poor indeed.

The Machinery and Implements portion of the paper was only fairly well done by about half the candidates, the remainder would not have passed on this portion alone; there were only three or four really good sets of answers. Both the written and oral examinations showed that in many cases students taking this paper had had hardly any opportunity of obtaining practical acquaintance with the working and construction of simple engines and the commoner agricultural implements.

GENERAL CHEMISTRY. Dr. H. B. Baker, F.R.S.

Old Regulations, 200 Marks.

The percentage of failures was rather higher this year than last. This is probably to be accounted for by many candidates who were not quite ready for the examination going in for the last examination of its kind. Some of the work was excellent and quite up to the standard of last year. I was more than ever convinced of the great value of the oral examination.

GEOLOGY. Dr. J. E. Marr, M.A., F.R.S., P.G.S.

Old Regulations, 100 Marks.

The answers of the candidates for the National Diploma in Agriculture who took Geology were moderate. There were few who had not at least a fair acquaintance with the principles of the subject, but no one shewed marked ability.

AGRICULTURAL ZOOLOGY. Prof. J. Arthur Thomson, M.A.

Old Regulations (Part I.), 100 Marks. New Regulations, 200 Marks.

The candidates who entered under the *new* regulations showed a higher average than on any occasion during the past twelve years. In most cases there was clear evidence of familiarity with actual specimens and their practical importance. Some of the candidates who entered under the *old* regulations did equally good work. In almost every case the insect supplied was correctly classified and the specimen supplied rightly identified. Very few candidates attempted to deal with the microscopic preparations. The question which was most frequently answered in an unsatisfactory way was the very conventional one, asking a statement of the general characters of Dipterous Insects.

PRACTICAL AGRICULTURE. Mr. T. A. Dickson, Mr. John Gilchrist, F.S.I.,
and Professor W. McCracken.

Old Regulations (Part II.), 500 Marks.

New Regulations { First Paper, 300 Marks.
Second Paper, 300 Marks.

The work of those who attained or approached the Honours standard was excellent. The standard of the rank and file was, however, susceptible of improvement, and we look forward with confidence to greater proficiency as the result of the alterations in the regulations under which future examinations will be held.

A number of candidates were not well informed as to the principles upon which rotations of crops are based, nor were the reasons for particular rotations generally understood.

Questions relating to farm drainage were not very well answered, owing, apparently, to the fact that many candidates had never seen drainage operations actually carried out.

Nearly all possessed a very practical acquaintance with the farming of their own parishes: we believe it would be an advantage if students were taught to take a wider interest in the more representative systems of British Agriculture.

We have again occasion to recommend candidates to read the questions carefully before beginning to answer them, as they may thus save time and earn better marks.

AGRICULTURAL BOOK-KEEPING. Mr. W. Home Cook, C.A.

Old Regulations, 200 Marks. New Regulations, 200 Marks.

As formerly the maximum number of marks obtainable was 200—the pass marks necessary for the Diploma being 120 under the *old* Regulations and 100 under the *new* Regulations. Forty-three presented themselves under the *old* Regulations, and of these twenty-six obtained the necessary pass marks. Twenty-three candidates presented themselves for examination under the *new* regulations and of these nineteen obtained the necessary pass marks.

While a number of the candidates showed a good knowledge of their subject, the average standard of efficiency was rather below that of recent years, and a few of the papers submitted manifested a failure to grasp the principles of book-keeping. More attention should be given to neatness and style.

AGRICULTURAL CHEMISTRY. Dr. J. Augustus Voelcker, Ph.D., M.A., F.I.C., and Dr. Bernard Dyer, D.Sc., F.I.C.

Old Regulations (Part II), 200 Marks. New Regulations, 300 Marks.

The work presented in this part of the Examination was of a most satisfactory kind. The candidates, alike under the *old* Regulations and the *new*, acquitted themselves exceedingly well, the general average attained being distinctly higher than on any previous occasion within our experience. This was more particularly the case with those who presented themselves under the *new* Regulations. As a matter of fact, all the candidates without exception fulfilled the requirements of the examination, and what is more satisfactory is that not only did they do this, but the majority scored high marks, and there were only three or four out of the whole number who were at all near the "border line."

AGRICULTURAL ENGINEERING. Mr. Arnold G. Hansard, B.A., M.Inst.E.E.

Old Regulations, 200 Marks.

A really good standard was reached by about one-quarter of the candidates who entered for this paper; and, with the exception of a few of the remainder, all obtained marks well above the minimum required for the Diploma, only one actually failing to reach this standard. On the whole the paper was better done than last year's, though again a good many answers to questions involving simple numerical calculations were spoilt by carelessness.

VETERINARY SCIENCE. Professor Sir John McFadyean, M.B.

Old Regulations (Part II), 100 Marks. New Regulations, 200 Marks.

With a few exceptions the candidates exhibited a satisfactory knowledge of the subject, both in the written and the *viva voce* part of the examination. Several of the papers were disfigured by gross mis-spelling of both ordinary and technical words. The average percentage of marks obtained under the *new* and *old* Regulations was practically the same.

12. The thanks of the Board are again due to the authorities of the Leeds University, for their liberality and courtesy in placing the Large Hall and other rooms of the University at the Board's disposal for the Examination; and to the Examiners, for the care and attention they bestowed upon the written answers to the papers set, and upon the *viva voce* examination.

ALEXANDER CROSS, *Chairman*.

THOMAS MCROW, *Secretary*.

NATIONAL DIPLOMA IN AGRICULTURE.

DIPLOMA-WINNERS, 1907-1911.

The Summary given below shows, at a glance, the professions or occupations followed by the winners of the National Diploma in Agriculture at the Annual Examinations held in the five years, 1907 to 1911 inclusive.

The total number of successful candidates in the five Examinations referred to was 141, and these received their preparation at fifteen teaching institutions, to the Principals of which the National Agricultural Examination Board are indebted for the information contained in the summary.

| | |
|--|-----|
| Farming at home | 27 |
| Farm Managers | 3 |
| ¹ Farming in Colonies and Foreign Countries | 15 |
| ¹ Colonial and foreign Agricultural posts | 19 |
| Engaged in Estate Office work | 7 |
| Dairy Factory Manager | 1 |
| Cheese Maker in Dairy Factory | 1 |
| Land Valuers under Finance Act | 4 |
| Dairy Chemist | 1 |
| Engaged in special research work | 4 |
| Milk Testers in Scotland | 4 |
| Lecturers, &c., at British Agricultural Colleges or under County Council | 26 |
| Assistant to Secretary, Scottish Agricultural Organization Society | 1 |
| Contractor for delivery of Milk by Motor from Ayrshire Creameries to Glasgow | 1 |
| Wesleyan Minister | 1 |
| Continuing their studies, in several cases for University Degrees | 12 |
| Deceased | 2 |
| No information obtainable concerning | 12 |
| Total | 141 |

¹ Places abroad to which N.D.A. winners of the years mentioned have gone include—Australia, New Zealand, Canada, South Africa, British East Africa, Nigeria, Egypt, India, Malay States, China, Asia Minor, Germany, Argentina, and the United States of America.

The particulars on which the above list is based were obtained in April and May, 1912.

II.—REPORT ON THE RESULTS OF THE SEVENTEENTH EXAMINATION FOR THE NATIONAL DIPLOMA IN DAIRYING, 1912.

1. The Seventeenth Annual Examination for the National Diploma in the Science and Practice of Dairying took place in September, 1912. The Examination for English candidates was held at the University College and British Dairy Institute, Reading, from September 14 to 20 ; and for Scottish Candidates at the Dairy School for Scotland, Kilmarnock, from September 20 to 28. At both centres the entries were larger than on any previous occasion.

2. Forty-one candidates were examined at the English centre. Of these, the following twenty-three satisfied the Examiners, and have therefore been awarded the National Diploma in the Science and Practice of Dairying :—

English Centre.

- JAMES HENRY ARTER, Midland Agricultural and Dairy College, Kingston, Derby.
LEONARD ASHWORTH, Midland Agricultural and Dairy College, Kingston, Derby.
ARTHUR SEYMOUR DREWE, University College and British Dairy Institute, Reading.
JOSEPH MELVILLE DRUCE, University College and British Dairy Institute, Reading.
MISS TEIFIONA EVANS, University College of Wales, Aberystwyth.
GUY RHODES HAIGH, Midland Agricultural and Dairy College, Kingston, Derby.
MISS DOROTHY MARY HALL, Midland Agricultural and Dairy College, Kingston, Derby.
MISS RUTH HENDRY, Dairy School, Kilmarnock, and University College and British Dairy Institute, Reading.
JOHN HODGE, East Anglian Institute of Agriculture, Chelmsford.
MISS NELLIE JAMES, University College and British Dairy Institute, Reading.
RODERICK EDWARD LOUCH, University College and British Dairy Institute, Reading.
MISS CATHERINE OSWALD, Lancashire County Council Dairy School, Hutton, Preston.
MISS FLORENCE PATRICK, East Anglian Institute of Agriculture, Chelmsford.
MISS MARY PEERS, Horticultural and Agricultural College, Studley, Warwickshire.

PERCIVAL JOHN POWELL, Midland Agricultural and Dairy College, Kingston, Derby.
 FRANK RAYNS, Midland Agricultural and Dairy College, Kingston, Derby.
 JONATHAN ALAN ROBOTHAM, Harper-Adams Agricultural College, Newport, Salop.
 WILLIAM PITTOCK SMITH, Midland Agricultural and Dairy College, Kingston, Derby.
 DUNCAN JOSEPH STEPHEN, Midland Agricultural and Dairy College, Kingston, Derby.
 MISS MARGARET GEMMELL DICKIE TAYLOR, Midland Agricultural and Dairy College, Kingston, Derby.
 MISS EDITH THOMAS, University College of Wales, Aberystwyth.
 MISS MARGARET WEATHERELL, Midland Agricultural and Dairy College, Kingston, Derby.
 MISS HELENA M. WILLIAMS, University College and British Dairy Institute, Reading.

3. Fifty candidates presented themselves for examination at the Scottish centre, the thirty-two whose names are given below being successful in gaining the Diploma :—

Scottish Centre.

JAMES ALLISON, 77, Henry Street, Bloemfontein, Orange Free State.
 MISS ISABELLA H. D. BURNS, Market Place, Selkirk.
 DUNCAN DAVIDSON, South Eastern Agricultural College, Wye, Kent.
 ALEXANDER G. G. ELLIS, Kinclune, Glenkindie, Aberdeenshire.
 DUDLEY V. FINDLAY, 6, Ellis Street, Kilmarnock.
 MISS MARION FLEMING, Struan, Busby Road, Giffnock.
 MISS MARGARET GRAY, Colaboll, Lairg.
 ARCHIBALD HAMILTON, 16, Dean Terrace, Kilmarnock.
 EDGAR HEWETSON, Soulby, Kirkby Stephen, Westmorland.
 REGINALD W. HUNTER, Cardean, Cardigan Road, Bridlington.
 FRED R. HUTTON, 3, Manse Street, Kilmarnock.
 JOHN KIRKWOOD, Scorrieholm, Lesmahagow.
 ROBERT LAMBERTON, Kirkcudbright Farm, Moniaive.
 ALEXANDER MCWILLIAM, Dhuloch, Kirkcolm, Stranraer.
 JAMES F. MALCOLM, Dunmore Farm, by Larbert.
 JOHN F. MILLIGAN, Easterton, Milngavie, Stirlingshire.
 MISS ANNIE MUIRHEAD, Caddens Farm, Lenzie.
 ALEXANDER MURRAY, 8, Rosslea Drive, Giffnock.
 JOSEPH MURRAY, Balruddery Farm, Dundee.
 MISS JESSIE G. PATERSON, 6, St. Vincent Street, Edinburgh.
 ERNEST PENNINGTON, Stoneleigh, Orrell, Wigan.
 MISS ALISON RANSFORD, 6, Queen Square, Bath.
 MISS ISABEL REID, Balgreen, King Edward.
 MISS JEAN D. SCOTT, Hall Hill Farm, Crossford, Carlisle.
 DAVID SIMPSON, Gladstone Place, Dyce, Aberdeenshire.
 MISS BESSIE STEVENSON, Old Mill Farm, Beith.
 JAMES A. SYMON, Newburgh, Aberdeenshire.
 GEOFFREY TALBOT, Moorside, Tonge Moor, Bolton.
 JOHN P. THOMPSON, Clifton House, Clifton, Manchester.
 HARRY R. TAYLOR, Wellsdale, Gathurst, Wigan.
 GWILYM WILLIAMS, Tanycoed, Llanwrda, S. Wales.
 HUGH ALEXANDER WYLLIE, Newmains, Caerlaverock, Dumfries.

4. Mr. John Gilchrist, the Examiner in General Dairying, in his report, states that the work done by the candidates at

Reading, with a few exceptions, showed a decided improvement as compared with past years. In general dairying the answers to the written paper were clearly stated. The Examiner would advise the candidates, however, to acquire a more thorough and practical knowledge of the keeping of dairy and farm accounts. The work of butter-making was, with the exception of a few cases, carried through efficiently.

At Kilmarnock, as at Reading, there was a record number of candidates, and the examination lasted over the entire week. There is now a great improvement in the average intelligence shown in the written answers and also in the oral examination. At this centre there was also a weakness in the general knowledge of dairy and farm accounts, and the Examiner recommends that candidates in future should give this branch of the subject more attention.

At neither centre, with a few exceptions, did the candidates obtain very high marks for their capacity to impart instruction to others.

5. The Examiner in Cheese-making (Mr. John Benson) reports that this year a good proportion of the candidates were found to be skilled cheese makers, the proportion of candidates who were really qualified being much higher than in recent years. On the other hand, a certain number of candidates who passed were rather near the border line, and another year's training and experience would have been to their advantage. In the written and oral portions of the examination the results were, on the whole, satisfactory, and in advance of those of last year, many of the candidates at the Scottish centre doing extremely well.

6. Dr. J. Augustus Voelcker, who this year acted as Examiner in Chemistry and Bacteriology at both Reading and Kilmarnock, reports that the forty candidates who presented papers in this subject at Reading, divided themselves roughly into two classes—the one, those who had a thoroughly satisfactory knowledge, the other, those who failed altogether or who just managed to meet minimum requirements. Of the former, no less than sixteen gained just about two-thirds total marks or over (which must be called distinctly good), three or four of these indeed, showing special knowledge. Of the latter class, there were eleven outright failures. As a rule, the written answers were better given than those in the *vivâ voce* examination. The bacteriological side of the subject was, speaking generally, treated more satisfactorily than that of general chemistry, thus showing that more attention requires to be given to the acquiring of a good ground-work of the science.

Of the forty-eight candidates who presented themselves for this subject at Kilmarnock, twenty, Dr. Voelcker states, obtained two-thirds total marks or over, three of these showing special excellence. There were only five absolute failures and seven others of doubtful qualification. On the whole, the *vivâ voce* part of the examination was even better done than the written part, several candidates distinguishing themselves by their ready and clear replies. While, in a few cases, there was a manifest weakness in knowledge of the principles of general chemistry, the examination as a whole brought out the fact that the teaching imparted had been of good and sound character. Especially was this the case as regards the subject of Bacteriology in its relation to Dairying, and this side of the examination left little to be desired.

ALEXANDER CROSS,
Chairman.

16 Bedford Square, London, W.C.
October, 1912.

DAIRY DIPLOMA WINNERS, 1907-1911.

During the five years, 1907 to 1911, 189 Diplomas were awarded (88 at the English centre ; 101 at the Scottish centre), and the information given below, showing the positions or occupations of the majority of these successful candidates, is taken from particulars kindly supplied in the early part of the present year by the heads of the various dairy training institutions.

Fifty-eight of these Diploma-winners are teaching agriculture, dairying or poultry-keeping at home and abroad ; 24 are engaged in farming (18 in Great Britain, 4 in Canada, 2 in Australia) ; 22 are stated to be engaged in dairy work at home ; 18 are managing or assisting in factories or creameries at home and abroad ; 9 are employed in milk testing ; 5 hold positions as dairy experts (1 in Cheshire, 2 in Cape Colony, 1 in Western Australia, 1 in South America).

Several of the remainder hold responsible positions, of which may be mentioned the following :—Agricultural Adviser to Government of Sierra Leone, Inspector of Farms for Condensed Milk Company, Inspector of Dairy Work in Ireland, Assistant Valuer under Finance Act, &c., &c.

ANNUAL REPORT FOR 1912 OF THE PRINCIPAL OF THE ROYAL VETERINARY COLLEGE.

ANTHRAX.

The following Table shows the number of outbreaks of this disease and the number of animals attacked during each of the last six years :—

| Year | | Outbreaks | | Animals attacked |
|------|-----|-----------|-----|------------------|
| 1907 | ... | 1,084 | ... | 1,456 |
| 1908 | ... | 1,105 | ... | 1,429 |
| 1909 | ... | 1,317 | ... | 1,698 |
| 1910 | ... | 1,496 | ... | 1,776 |
| 1911 | ... | 907 | ... | 1,120 |
| 1912 | ... | 743 | ... | 840 |

These figures appear to suggest that there has been a marked reduction in the number of outbreaks during the last two years, but, as was pointed out in the previous Annual Report, the statistics relating to this disease since January 1, 1911, are not strictly comparable with those for previous years. Prior to the date mentioned every case reported to the Board of Agriculture and Fisheries by a veterinary inspector to a local authority as a case of anthrax figured as such in the annual returns, but since the beginning of 1911 the diagnosis in all suspected cases has been in the hands of the Board, with the result that the total number of cases for the twelve months is considerably reduced by the elimination of errors in diagnosis. The figures for the last two years, therefore, give a much truer measure of the incidence of the disease in Great Britain than those collected under the old system.

The figures for the last two years are comparable, and it is satisfactory to note that fewer outbreaks have been verified last year than in the immediately preceding one. No doubt the newer statistics are not yet quite accurate, for there is reason to fear that even now some cases of the disease are not reported, but the diffusion of knowledge regarding the circumstances which ought to create a suspicion of anthrax must year by year reduce the number of unreported cases.

It is also satisfactory that the number of animals attacked in proportion to the number of outbreaks was low, but that has always been a feature of the returns relating to anthrax in this country, and the fact proves that when proper precautions are taken in dealing with the first case an outbreak is, as a rule, easily brought to an end.

When one considers the large number of cattle, sheep, horses, and swine—all animals susceptible to anthrax—in this country, a total of 840 cases in the year appears to be small. In reality the losses from the disease would probably be insignificant were it not that the seeds of it are frequently introduced from abroad in imported feeding stuffs, and especially in linseed and cotton cake.

GLANDERS.

The following Table shows the varying incidence of glanders in Great Britain during the last eight years :—

| Year | | Outbreaks | | Animals attacked |
|------|-----|-----------|-----|------------------|
| 1905 | ... | 1,214 | ... | 2,068 |
| 1906 | ... | 1,066 | ... | 2,012 |
| 1907 | ... | 854 | ... | 1,921 |
| 1908 | ... | 789 | ... | 2,433 |
| 1909 | ... | 533 | ... | 1,753 |
| 1910 | ... | 351 | ... | 1,014 |
| 1911 | ... | 208 | ... | 501 |
| 1912 | ... | 173 | ... | 314 |

It is very satisfactory to note that during the past year there were fewer outbreaks and fewer cases of glanders than during the preceding one, although that was in this respect the best since the disease was first dealt with under the Contagious Diseases of Animals Act. Between 1874 and 1905 the number of reported outbreaks per annum fluctuated considerably, but in 1904 they reached a total of 1,529. The decline which then began must be set down to the voluntary effort which the owners of many of the large London studs made to eradicate the disease by carrying out systematic tests with mallein, but the excellent results obtained during the last four years must be placed to the credit of the Glanders Order which came into force on January 1, 1908. The most important provision of this Order is the one which places restrictions on the movement of every horse known to have been in an infected stable, and which enables the local authority to maintain these restrictions until a mallein test has removed the suspicion attaching to the animal. Indirectly, therefore, the Order compels the owner of horses among which glanders has broken out to allow the whole of the animals that have been exposed to the risk of infection to be tested with mallein. The horses that react to the test are then slaughtered, full value being paid to the owner when the post-mortem examination shows that it was not affected with glanders, and half value in the contrary case.

It is obvious that this method of dealing with the disease is bound to succeed provided (1) that there is honest notification of suspected cases, and (2) that the mallein test is a reliable means of diagnosis. With regard to the latter point it is a

remarkable fact (mentioned in the Report of the Chief Veterinary Officer of the Board of Agriculture and Fisheries) that among the animals slaughtered under the Order in consequence of a reaction to mallein, in 1911 there was only one in which the post-mortem examination failed to reveal the lesions of glanders.

The results obtained during the past year are in one respect disappointing, for there has been only a slight falling off in the number of outbreaks as compared with the previous year, although there has been a marked reduction in the number of horses attacked. It was, however, foreseen that the reduction in the number of outbreaks which the Glanders Order brought about between 1908 and 1911 was not certain to be continued at the same rate until the end. The measures now in force have been proved absolutely efficient for stamping out glanders in any stud of horses, but these measures can only be enforced where the existence of the disease is known or suspected, and it is here that prompt notification by owners becomes important. The intentional concealment of a case of glanders, and especially the sale of a suspected horse, may sow the seeds of the disease widely before the danger comes to the knowledge of the local authority, and thus considerably delay the final extermination. There is, however, no reason to fear any serious recrudescence of glanders or to doubt that it will before long be stamped out.

SWINE FEVER.

The following Table shows the number of reported outbreaks of this disease during each of the last six years :—

| Year | ... | ... | ... | Outbreaks |
|------|-----|-----|-----|-----------|
| 1907 | ... | ... | ... | 2,336 |
| 1908 | ... | ... | ... | 2,067 |
| 1909 | ... | ... | ... | 1,650 |
| 1910 | ... | ... | ... | 1,598 |
| 1911 | ... | ... | ... | 2,466 |
| 1912 | ... | ... | ... | 2,920 |

These figures show that swine fever was more prevalent last year than it was six years ago, and, indeed, the past year was in this respect the worst since the beginning of the century. The fact is the more to be regretted because since October, 1911, the methods of dealing with the disease have been strengthened in several particulars, in conformity with recommendations made in the Interim Report of the Departmental Committee which was appointed in 1910 to inquire into the cause of the continued prevalence of the disease. The present position is also entirely unsatisfactory inasmuch as it would appear that since the disease has been dealt with directly by the Central authority no reduction in its prevalence has taken place. The last complete year in which swine fever

was dealt with by the local authorities was 1892, and in that year the reported outbreaks numbered 2,748 and the swine attacked 13,957. As will be seen from the Table, the past year was worse than 1892 in respect of the number of outbreaks, and it probably was also worse as regards the number of animals attacked.¹

It has sometimes been maintained that the returns with regard to the prevalence of this disease are untrustworthy, being vitiated by the inclusion of many cases wrongly diagnosed as swine fever, and that it is therefore not certain that the disease has actually increased within recent years. A perusal of the evidence given by witnesses who appeared before the Departmental Committee shows that this contention absolutely broke down, and there is therefore no reason to suppose that the proportion of errors in diagnosis is serious, or to doubt the general trustworthiness of the published statistics as a measure of the prevalence of disease from year to year.

The fact appears to be that the difficulties in the way of stamping out swine fever were not fully appreciated when the Board of Agriculture was urged to take the disease in hand with that object. The greatest obstacle to stamping out is the difficulty of diagnosing the disease during life, and this arises from the fact that its existence is by no means always manifested by visible signs of ill-health. Concealment of disease is therefore often easy, and suspected animals may often be sold with but little risk of detection. When this is true of any disease that is highly contagious, its eradication can only be effected by drastic measures involving the prompt slaughter of both diseased and suspected animals, severe restrictions on movement in affected areas, and serious penalties for concealment of disease.

SHEEP SCAB.

The number of reported outbreaks of this disease during the last six years were :—

| Year | | | | Outbreaks |
|------|-----|-----|-----|-----------|
| 1907 | ... | ... | ... | 751 |
| 1908 | ... | ... | ... | 849 |
| 1909 | ... | ... | ... | 685 |
| 1910 | ... | ... | ... | 556 |
| 1911 | ... | ... | ... | 434 |
| 1912 | ... | ... | ... | 302 |

It is apparent from these figures that the methods of dealing with the disease which have been in operation for the last few years, and especially the compulsory dipping of sheep, have had a marked effect. In respect of the small number of

¹ The official returns do not show the exact number of animals attacked, but during 1912 39,653 swine were slaughtered as diseased or exposed to infection.

outbreaks 1911 was the best year on record, and the past year is still better. It is very satisfactory also that the number of counties affected is being gradually reduced.

FOOT-AND-MOUTH DISEASE.

During the year 1912, 83 outbreaks, with 645 animals attacked, were reported. The outbreaks during the previous year numbered 19, with 487 animals attacked.¹

PARASITIC MANGE.

The parasitic mange order which is now in force came into operation on January 1, 1912, and during the course of the year 2,871 outbreaks, with 6,074 animals attacked, were reported.

The term "mange" covers cases of skin disease which are caused by minute animal parasites—the so-called acari, which are nearly related to the common mites. Three different species of acari are the cause of skin disease in horses, but only two of them are brought under the new order, viz., sarcoptic and psoroptic.

The third, or symbiotic mange, has not been considered sufficiently serious to merit its being scheduled as a contagious disease. This last form of mange affects principally the skin of the legs in horses, and although it causes considerable itchiness it does not usually impair the working usefulness or the general condition of the horse.

The sarcoptic form of mange affects the skin of the head, neck, and trunk, and the principal symptoms are persistent scratching and rubbing, falling out of hair, and thickening of the skin. Psoroptic mange may also affect the skin of the body, but it is principally the mane and the tail which it attacks. Both forms of the disease are highly contagious when once introduced into a stable, but the sarcoptic form is the more serious of the two because the acarus which is the cause of it burrows into the substance of the skin, rendering its destruction by skin dressings more difficult.

Although the forms of mange scheduled under the order are seldom or never fatal, their effects are by no means negligible, (1) because there is practically no such thing as spontaneous recovery, and (2) because when the skin becomes extensively affected, the worry to which the animal is subjected by the itchiness interferes with its rest and generally leads to a serious loss of condition.

The order requires owners who suspect the existence of the disease to give notice to a police officer, and when the diagnosis

¹ For further particulars see the special article on Foot-and-Mouth Disease in this Volume, page 90.

is confirmed the local authority have the power to require the detention and treatment of diseased animals and of animals that have been exposed to risk of contagion.

CONTAGIOUS ABORTION.

The Departmental Committee which was appointed by the President of the Board of Agriculture and Fisheries in 1905 to enquire into epizootic abortion in cattle found that the common, if not the exclusive, cause of multiple cases of abortion occurring in the same herd in Great Britain was a very minute bacillus, identical with the one which Professor Bang had previously proved to be the cause of epizootic abortion in cattle in Denmark. This fact having been determined, the Committee devoted a good deal of attention to the question of diagnosis, for it was obvious that in the absence of some reliable method of distinguishing between cases of contagious and non-contagious abortion there was little prospect of being able to grapple successfully with the disease. The Committee found that what is termed the agglutination method of diagnosis promised to be of great service in this connection, but the observations and experiments made by the Committee were not sufficiently numerous to justify a hard and fast conclusion as to the absolute reliability of the method in actual practice. Observations which have since been made by the writer, in conjunction with Sir Stewart Stockman, Principal Veterinary Officer to the Board of Agriculture, have proved that the test is one of very great value.

Briefly stated, the nature of the test is as follows: In the case of some bacterial diseases certain substances appear in the blood of the affected animal, which have a remarkable affinity for the bacteria under whose agency they have been produced, that is to say, the substances which appear in the animal have a marked tendency to combine with or to act upon the bacteria which are the cause of the disease in question. Among these substance are the so-called "agglutinins," the presence of which can be detected in the animal's blood in the following manner. A small quantity of blood is withdrawn from a vein of the diseased or suspected animal, and this blood is allowed to coagulate and express the clear watery liquid which is termed serum. A quantity of artificial culture of the particular bacterium is rubbed up or shaken up with water so as to make the latter uniformly and only slightly hazy or turbid, the turbidity being due to the bacteria suspended in the mixture. When a small quantity of such a bacterial mixture is set aside in a test tube it will often retain its haziness for several days or even longer. To such a tube of bacterial mixture one adds some of the above-mentioned blood serum from

a suspected animal, and if agglutinin has been present in this serum the effect of the addition is to cause the hazy liquid to become clear. This clearing up of the liquid is ascribable to the fact that the agglutinin acts on the suspended bacilli and causes them to collect together in clumps, which then tend to fall to the bottom of the tube.

The quickness with which this effect is produced depends on a number of different factors, including the amount of serum added and the temperature at which the experiment is carried out. It may be said, however, that when any considerable amount of agglutinin is present in the animal's blood the effect of the test is very striking when one compares the appearance of a control tube of bacterial mixture without serum with that of a tube of the same mixture to which serum has been added. In the former tube the mixture preserves all its original haziness, while in the latter it may have become as clear as pure water.

In order to appreciate the actual value of the agglutination test for the diagnosis of any disease one must know (1) whether the test generally or always has a positive result when serum from a diseased animal is used, and (2) whether a similar positive result is ever or frequently obtainable with serum from a healthy animal, or from one not affected with that particular disease. It is obvious that a test which frequently failed to give positive results with serum from a diseased animal would not be of great value, and that a test which frequently gave positive results with serum from healthy animals would be quite useless.

It was therefore resolved to make a large number of comparative observations, using blood both from presumably healthy animals and from others which had actually aborted or which belonged to herds in which one or more cases of abortion had recently occurred. The first class of animals included 535 bulls, steers, non-pregnant heifers, and young calves, and it was found that in only one of these animals was the result of the agglutination test markedly positive. Among 127 animals which had recently aborted or which came from herds in which cases of abortion had recently occurred the test had a positive result in sixty-two cases. Up to the present time there has not been encountered any case certainly known to be one of contagious abortion in which the animal's blood has not reacted positively to this test. It ought to be stated, however, that in one instance the blood of a cow which had recently aborted failed to give a positive result with the agglutination test, although the circumstances rather strongly indicated that the abortion had been of the contagious kind. However, even allowing that this was a case of actual failure of the test, and

also allowing that the one case out of 535 presumably healthy animals in which the test had a positive result was also a failure or error of the test, it is perfectly clear that this means of diagnosis is calculated to render very great service in dealing with contagious abortion.

It must be observed, however, that it is not at all certain that the test was at fault in the one case in which serum from a presumably healthy animal gave a positive result, because it must not be assumed without strong evidence that infection with the abortion bacillus is confined to cows or to pregnant animals. With a view to clearing up this point a considerable number of experiments (of which details will subsequently be published) have already been made, and the results have been rather surprising, inasmuch as it has been found easy to infect bovine animals of both sexes and of various ages with the abortion bacillus. Infection has been obtained in both sexes by giving a small quantity of artificial culture by the mouth, and it has been produced in bulls and steers by injecting the bacilli into the sheath. In these experiments the blood was tested at intervals after the attempt to infect, and it was assumed that infection had actually taken place when the agglutination test gave a positive result.

The experiments and observations which have already been made appear to justify the statement that in dealing with outbreaks of abortion the agglutination test will enable one to say with almost absolute certainty whether the disease is of the contagious kind or not. The value of the test is greatly enhanced by the fact that it is not merely a reliable means of diagnosis after abortion has actually occurred, but can be successfully employed for diagnosis in animals that are still carrying their calves.

When the first case of abortion occurs in a herd the proper procedure therefore now is to have the animal's blood tested immediately, and in the event of the result of the test being positive this should be followed up by testing the blood of all the other animals in the herd, so as to detect those in which infection has already taken place.

During the past year this system has already been adopted in a number of herds, and so far the method promises to have very successful results. The experiments are being continued, and members of the Society who have, or who suspect that they have, contagious abortion in their herds are invited to apply for assistance in diagnosis to the Royal Veterinary College.

JOHN MCFADYEAN.

Royal Veterinary College,
London, N.W.

ANNUAL REPORT FOR 1912 OF THE CONSULTING CHEMIST.

THE number of samples analysed during the year was much about the same as in 1911, being 437 as against 439 then. To this must be added 36 samples of cider and perry analysed in connection with the Society's Country Show at Doncaster. In consequence of the cancelling of the cattle classes at Doncaster there were, however, no samples of milk taken for analysis.

There have not been any striking features marking the year. The general rise in the price of feeding materials, noted in 1911, has continued, and both linseed cake and cotton cake have been very dear indeed. This, along with a very uncertain trade in stock, has caused many to reduce the extent to which they have been accustomed to use these staple foods, and to simultaneously increase the trade in compound feeding cakes. Of these latter there are many different "makes" on the market, and very variable in character—some distinctly good, some medium, and many far from satisfactory. I have frequently pointed out that the figures of an analysis alone do not indicate whether a compound cake be made from good and suitable materials, or even if it be in good condition. It is much more important, indeed, to know what a cake is made of, and microscopical examination alone can reveal this.

An instance of the great rise in price of feeding materials is afforded by the case of rice meal, which, a few years ago, cost only 4*l.* 10*s.* or 4*l.* 15*s.* a ton, but now has risen to 6*l.* 10*s.* or 6*l.* 15*s.* a ton.

Only a few new materials have come to the front lately—one of these, and which, I find, is now much used in the manufacture of compound cakes, is *Kapok* seed, the seed of a tree sometimes known as the "White Silk-cotton Tree" (*Eriodendron anfractuosum*), and which grows in Java and throughout India. From the fruit a fibre, or, rather, "floss," is obtained, and the seeds yield an oil somewhat resembling cotton-seed oil, the residual matter, after expression of the oil, being utilised as cattle-food. I cannot say that I know anything definite against the use of this material, and yet I must add that I have come across not a few cases where harm is stated to have been produced in stock, and in which I have found *Kapok* seed to be present in compound cakes in considerable amount.

Another material which continues to be largely used in compound cakes is rape-seed, or, more commonly, rape-refuse. I have frequently stated my objections to the use of this material, and I had again this year occasion to investigate a case where rape-seed had been used in a compound cake, and

harm had resulted to stock feeding on the cake. I found, both by chemical and microscopical tests, a marked amount of mustard seed to be present, and to this, I have no doubt, the trouble was due.

The Fertilisers and Feeding Stuffs Act continues to be administered in much the same way as heretofore. In some counties and boroughs it is energetically worked, and the need of watchfulness as regards the purchase of feed-stuffs and manures for the farm is frequently well illustrated. In other places the Act remains almost a "dead letter." Up to the present, the oft-talked-of amendment of the Act has gone no further, and the progress of the "Sales for Agricultural Purposes" Bill seems to be indefinitely arrested.

The adulteration of "offals" still continues, and, in addition to the employment of oat "shudes" and rice "shudes" (which have been frequently mentioned before in the case of middlings, sharps, and other wheat offals, as also of barley meal), a new adulterant—pea-husk—has come to the fore, and several cases dealing with this have been reported to the Chemical Committee.

In connection with the use of linseed cake, it will be remembered that considerable agitation was caused by the discovery that linseed, under certain conditions of growth and state of ripening, could be shown to contain bodies known, in chemical phraseology, as "cyanogenetic glucosides," bodies which, on the seed being macerated and stirred up with warm water, give rise to hydrocyanic (prussic) acid, and which hence were believed to be likely to do injury to stock. Of late, further work of research on this subject has been carried out, with the general result of showing that even when these bodies are present in what are, as yet, the highest quantities known in the case of linseed cake, they do not produce any ill effects, so long as the cake is fed in the dry state. The process of digestion would not seem to have any influence in setting free hydrocyanic acid from the glucosides. But, if linseed cake containing these bodies is soaked, then hydrocyanic acid may be set free and the cake thus become poisonous.

Two matters which were referred to in some detail in my last annual report have been again very prominent, and it may be well therefore to revert to them. I allude to (1) the use of sawdust—in its raw or its prepared condition—in feeding cakes and meals, and (2) the so-called "solubility" of basic slag.

In regard to sawdust, it is well known that—under the name "bastol" or "bastol cake"—sawdust that has been treated by chemical means is employed as a constituent of feeding cakes and meals, and that these foods have obtained a certain amount of sale, even at prices as high as 8*l.* a ton.

Recently there have been published the results of further experiments on feeding stock with raw and prepared sawdust, and the general outcome of these has been to show that crude sawdust remains practically undigested in the animal economy, and that the admixture of molasses with it in no way improves its power of being utilised. As regards the "treated" sawdust, while it must, in fairness, be allowed that a certain proportion of sugar-like bodies is produced from the sawdust, and the woody fibre rendered somewhat more digestible, yet, when the material was fed to animals it had a reverse action on the other constituents of the diet and made them less assimilable. Further, that this depreciating effect was in no way remedied by the incorporation of molasses with the treated sawdust. The general conclusion was accordingly come to that sawdust, whether in the raw or the treated condition, and whether mixed with molasses or not, is not at all a proper material to use for stock.

The second matter, that of the "solubility" of basic slag, has been recently much discussed. It cannot be said, however, that much light has been shed upon the real point at issue, viz., whether the value of basic slag rests in the amount of total phosphates, or in that of phosphates soluble in an arbitrary (2 per cent.) solution of citric acid, used under certain definite conditions. This only goes to show the need of further and careful enquiry, and, with this view, experiments are now being conducted at the Woburn Pot-culture Station.

The following are details of some of the matters brought to my notice during the year :—

A. FEEDING STUFFS.

1. *Rice Meal.*

This material has of late gone up greatly in price. It is not very long ago since rice meal was quoted at 4*l.* 10*s.* per ton or thereabouts, but now the price has risen to as much as 6*l.* 15*s.* per ton ex. quay. The following is the analysis of a sample which was sold as "genuine rice meal," guaranteed to contain 11 per cent. of oil, and 12 per cent. of albuminoids, the price being 7*l.* per ton.

| | |
|---|--------|
| Moisture | 10·01 |
| Oil | 13·41 |
| ¹ Albuminoids | 11·94 |
| Starch, woody fibre, &c. | 55·83 |
| ² Mineral matter (ash) | 8·81 |
| | <hr/> |
| | 100·00 |
| | <hr/> |

¹Containing nitrogen 1·91

²Including silica 1·79

This came well above the guarantee in oil, and was practically up to it in respect of albuminoids. Moreover, it was genuine and in good condition. The price, however, seems to me considerably in excess of the real feeding value of this material.

2. Oat Feed.

A material sold under the above name was sent to me, and gave the following analysis :—

| | |
|--|--------------|
| Moisture | 7.43 |
| Oil | 2.66 |
| ¹ Albuminoids | 5.50 |
| Starch and digestible fibre. | 52.97 |
| Woody fibre | 25.51 |
| ² Mineral matter (ash) | 5.93 |
| | <hr/> 100.00 |
| ¹ Containing nitrogen | .88 |
| ² Including sand and silica | 4.39 |

The price of this was 5*l.* 3*s.* 9*d.* per ton delivered. My examination of it showed it to contain no less than 65 per cent. of husk, and, as the above analysis shows, there is over 4 per cent. of siliceous matter. The material was one of very inferior quality, and the price is, of course, an extravagant one.

3. Boiled Locust Beans.

A Member of the Society sent me a sample under this name. The price of it was 3*l.* per ton. The material was very wet, and, on analysing it, I found it to contain 87.83 per cent. of water, and, accordingly, only 12.17 per cent. of total dry matter. This would give only about 2½ cwt. of feeding material in one ton of a delivery.

In view of the wet condition and the fact that a considerable proportion of the sugar must have been extracted in the boiling, it is clear that the feeding value of the material can be but small, and that the price was altogether beyond reason.

4. Chocolate Sweepings.

A sample was sent me of waste material from a chocolate factory. It was sweet and pleasant to the taste, and, on analysis, gave the following results :—

| | |
|---|--------------|
| Moisture | 3.14 |
| Oil | 25.25 |
| ¹ Albuminoids | 4.37 |
| Sugar and other Carbohydrates | 65.40 |
| ² Mineral matter (ash) | 1.84 |
| | <hr/> 100.00 |
| ¹ Containing nitrogen | .70 |
| ² Including sand | .44 |

The material was clean and in good condition, and I can well understand that it would be a useful food, more particularly for pig-feeding. The price was 3*l.* a ton, which was not by any means too dear.

B. FERTILISERS.

1. *Basic Slag.*

Reference has been made in the earlier part of this Report to the matter of the "solubility" of basic slag. In this connection the following case may be mentioned, in which a Member sent a sample of basic slag requesting that the "solubility" might be determined, not merely with one single extraction with citric acid, but with a second and a third as well.

The following figures were obtained :—

| | 1st treatment for half-an-hour with 2 per cent. Citric Acid Solution | 2nd treatment (Extraction for a further half-hour) | 3rd treatment (Extraction for a further half-hour) |
|--|---|---|---|
| Percentage of :— | (a) | (b) | (c) |
| Phosphoric acid . . . | 15.49 | 2.18 | .19 |
| Equal to tribasic phos- phate of lime . . . | 33.85 | 4.76 | .42 |

2. "*Grass Producer*" (*Guarantee wrongly stated*).

A Member of the Society drew my attention to a manure sold under the name of "grass producer," the guaranteed analysis of which was given as follows :—

| | |
|--|-------|
| Nitrogen, equal to ammonia | 2.3 |
| Phosphates, equal to tri-calcium phosphate | 4.5 |
| Potassium oxide, equal to sulphate of potash | 1.2 |
| Lime | 10.20 |

My analysis of the sample showed the guarantee to be practically satisfied, but I should point out that in two respects this guarantee was put out in a form which is contrary to the requirements of the Fertilisers and Feeding Stuffs Act. The latter requires the amount of nitrogen to be specifically stated, and not merely its equivalent in ammonia; similarly, the amount of potash (potassium oxide) must be given, and not this translated into terms of sulphate of potash. To do otherwise is misleading to the purchaser.

3. "*Fertiliser*."

There was brought to my notice a circular with letter referring to a material offered under the above name, and manufactured at Liverpool. The guarantee was given in the following terms :—

| | |
|--------------------------------------|------|
| Nitrogen, equal to ammonia | 1.50 |
| Soluble phosphates | 9.0 |
| Insoluble phosphates | 1.0 |

The price paid was 3*l.* 10*s.* per ton, carriage paid in 2 ton lots, 5 per cent. discount being allowed if payment was made within one month after delivery. To this was added the significant remark that "a commission of 12*s.* 6*d.* will be paid for every ton delivered."

In the first place, I would remark that the guarantee was not in accordance with the Fertilisers and Feeding Stuffs Act, inasmuch as the percentage of nitrogen was not stated, but its equivalent in ammonia; secondly, that the price was largely in excess of the real value of such a material. One can therefore well understand the existence of a margin for a "commission of 12*s.* 6*d.* a ton."

4. Bone Ash.

Under this name was sent me a material which was stated to have come from some works, and which was sold under the name "Bone Ash," the price being 41*s.* per ton. The analysis of the material was as follows:—

| | |
|---|--------|
| Moisture | 15·57 |
| Soluble phosphates | 12·56 |
| Insoluble phosphates | 35·05 |
| Sulphate of lime, alkaline salts, &c. | 34·24 |
| Insoluble siliceous matters | 2·58 |
| | <hr/> |
| | 100·00 |
| | <hr/> |

It will be seen that this was not simply bone ash, but probably this material partly dissolved with oil of vitriol. The price, however, could by no means be called high, although the material was in lumpy condition and difficult of application to the land.

5. Sud-Cake.

A sample of this was sent me, the price being 14*s.* per ton, carriage, 11*s.* additional, thus making, in all, 25*s.* per ton. The analysis was as follows:—

| | |
|--|--------|
| Moisture | 3·89 |
| ¹ Organic matter | 43·86 |
| Oxide of iron and alumina | 8·29 |
| Lime | ·28 |
| Sand | 43·68 |
| | <hr/> |
| | 100·00 |
| | <hr/> |
| ¹ Containing nitrogen | 2·31 |
| equal to ammonia | 2·81 |

The material was in bad condition, and would require a good deal of breaking up before it could be used on the land. The price, considering the condition and the carriage which

would have to be paid, was distinctly above the real value of the manure.

6. *Soot.*

A good sample of this was the following :—

| | |
|--|--------|
| Moisture | 13·01 |
| ¹ Organic matter and salts of ammonia | 51·19 |
| Oxide of iron, &c. | 14·72 |
| Sand | 21·08 |
| | <hr/> |
| | 100·00 |
| ¹ Containing nitrogen | 3·67 |
| equal to ammonia | 4·46 |

This cost 2*l.* per ton on rail, and was quite good value at the price.

C. MISCELLANEOUS.

1. "*Extermerite.*"

A sample of this material was sent me for examination. It cost 2*l.* per ton on rail, and was stated to prevent the ravages of wireworm, turnip fly and other insects pests, to prevent "finger and toe" in turnips, and to increase crops generally.

The analysis of it is appended, and my examination went to show that it consisted, practically, of lime refuse together with a little naphthalene. The actual manurial value, as will be seen from the analysis, would be but small.

| | |
|---|--------|
| Moisture | 5·58 |
| ¹ Organic matter | 24·50 |
| Phosphate of lime | ·76 |
| Carbonate and sulphate of lime, &c. | 33·66 |
| Insoluble siliceous matter | 35·50 |
| | <hr/> |
| | 100·00 |
| ¹ Containing nitrogen | ·56 |
| equal to ammonia | ·68 |

2. *Hop Bine.*

A question having arisen as to what manurial value would be lost to the land through the carrying of the hop-bine away, instead of following the usual practice of burning it and spreading the ashes on the land, I went into this matter, and came to the conclusion that, in view of the amounts of phosphoric acid and of potash which might be expected to be removed, a compensation value of 6*s.* 6*d.* per acre would fairly meet the circumstances.

The following is a list of the samples submitted to me during the year :—

| | |
|--|------------|
| Linseed cakes | 8 |
| Uncorticated cotton cakes | 16 |
| Decorticated cotton cakes | 10 |
| Compound feeding cakes and meals | 63 |
| Cereals | 17 |
| Rice meal | 3 |
| Bean and pea meals | 2 |
| Dried grains | 1 |
| Castor meal | 1 |
| Superphosphates | 15 |
| Dissolved bones | 8 |
| Compound manures | 11 |
| Raw and steamed bones | 10 |
| Peruvian guanos | 4 |
| Fish, meat, and bone guanos | 11 |
| Basic slag | 31 |
| Nitrate of soda | 8 |
| Sulphate of ammonia | 6 |
| Potash salts | 6 |
| Shoddy | 50 |
| Refuse manures | 1 |
| Lime | 8 |
| Soot | 2 |
| Waters | 89 |
| Soils | 19 |
| Milk, cream, and butter | 16 |
| Sewage sludge | 1 |
| Rape cake manure | 3 |
| Hay chaff | 1 |
| Hops | 1 |
| Miscellaneous | 15 |
| Total | 437 |

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ANNUAL REPORT FOR 1912 OF THE BOTANIST.

THE results of the season's seed-testing showed, on the whole, a very satisfactory state of affairs both with regard to the purity of the samples and their germinating capacity.

The various clovers proved to be the worst seeds examined, though it is possible nowadays to purchase some, such as the varieties of red clover, in a practically pure condition. In fact several samples have been tested in which no impurities could be detected. A purity of at least 98 per cent. should be insisted upon by the purchaser, and even with this guarantee it is worth while to scrutinise the sample carefully with a view to determining what the waste of 2 per cent. really consists of. Possibly a portion may be grit, fragments of stone, &c., but the greater part usually consists of weed seeds. In red clover the commonest of these seeds are those of the relatively harmless plantain and campion, or the noxious clover dodder and dock. If the seeds of clover dodder, whether of the European or the Chilian species, occur the sample should be rejected without further consideration. There is no valid excuse for the presence of either of these seeds, for they are readily removed by modern screening machinery. Samples containing dock seeds should be viewed with suspicion. If only 1 per cent. by weight is present this means that each pound of clover seed contains about 3,200 dock seeds. Clover seed containing this quantity if sown at the rate of, say 16 lb. to the acre, provides every square yard with some ten or eleven potential dock plants. In the report of the previous year attention was called to the fact that red clover seed bought in a more or less uncleaned state direct from the grower was a fruitful source of docks in subsequent crops. One such sample was received this season. Amongst other impurities it contained 6 per cent. of dock seeds of excellent vitality. The seed was offered at 2*d.* per pound below the market price of good clover seed, so that its use would show a saving of about 2*s.* 6*d.* per acre. It would be interesting if one could compare the cost of eradicating the crop of docks resulting from a sowing of $6 \times 3200 \times 16$ seeds per acre with the amount saved initially on the seed.

A rather striking example of false economy in seed purchasing was afforded by a mixture described as being "suitable for the formation of permanent grass." A rough analysis showed that the composition was as follows :—

| | | |
|---------------------------------------|---|-----------------|
| Perennial rye-grass | } | 30 per cent. |
| Italian rye-grass | | |
| Black medick or trefoil | } | 30—35 per cent. |
| Red clover | | |
| Alsike | | |
| Cocksfoot | } | 15—20 per cent. |
| Foxtail | | |
| Meadow fescue | | |
| Smooth stalked meadow grass | | |
| Wood meadow grass | | |
| Hard fescue | } | 20 per cent. |
| Timothy grass | | |
| <i>Anthoxanthum puelii</i> | | |
| Yorkshire fog | } | 20 per cent. |
| Soft brome | | |
| <i>Aira flexuosa</i> | | |
| <i>Festuca myuros</i> | | |
| Dock | | |
| Buttercup | } | 20 per cent. |
| Geranium | | |
| Plantain | | |

The first twelve species in the list may all be used for the purpose. Further they can all be purchased in a reasonably pure condition. The remaining nine species represent common impurities and adulterants, and they constitute some 20 per cent. of the whole bulk. *Anthoxanthum puelii* is a worthless annual grass which is frankly described in a continental list as being "useful for mixing with *Anthoxanthum odoratum*" (sweet vernal grass). *Aira flexuosa* also was formerly much used for adulterating the seeds of the expensive yellow oat grass.

Another, possibly accidental, case of adulteration is of some interest. In this case some 12 per cent. of red clover had found its way into a sample of foxtail grass. The seed of this grass is very light and bulky, and this quantity of red clover seed is hardly noticeable at first sight; and, even if the presence of a few seeds is detected, the fact that they are not noxious weed seeds would lead the observer to pay little or no attention to them. It is only when they are picked out and their weight compared with that of the rest of the sample that one realizes that two ounces out of every pound of Foxtail consist of red clover seeds.

Fortunately, the examples quoted are far from typical of the purity of the bulk of the seeds purchased by members, though investigations recently made in the Botanical department show that they are not altogether misrepresentative of much of the seed which small farmers are driven to purchase.

The average percentage of germination of the seeds most frequently received for testing during the season was as follows:—

Red clover 91, White clover 89, Alsike 95.5, Lucerne 92, Sainfoin 84, Perennial rye-grass 92, Italian rye-grass 91, Cocksfoot 85.

A word or two of explanation regarding the interpretation of seed analyses may be of value. The tests carried out in the department are usually stopped as soon as they have shown that the germinating capacity is equal to that demanded on the Society's order forms. Where detailed analyses, for comparison with seedsman's guarantees, are required, the fact should be mentioned at the time of sending the samples. Such a course may save re-testing and a considerable delay, for in the case of some grass seeds, tests have to be kept running for forty-two days before there is any certainty that no more seeds will germinate. In the event of the analyses showing a lower germinating capacity than the guaranteed figures, some allowance must be made to cover possible errors of observation. It must be remembered that it is practically impossible to draw an absolutely representative sample from bulk and when the sample has to be further reduced to four hundred or six hundred seeds for a germination test, a second and probably larger sampling error creeps in. To cover this the following "latitudes" are generally recognised as allowable :—

| Percentage of germination between | | | | | "Latitude" percentage |
|--------------------------------------|---|---|---|---|--------------------------|
| 99·9 —95 per cent. | . | . | . | . | 4·2 |
| 94·99—90 | " | . | . | . | 5·7 |
| 89·99—85 | " | . | . | . | 6·8 |
| 84·99—90 | " | . | . | . | 7·7 |
| 79·99—75 | " | . | . | . | 8·3 |
| 74·99—70 | " | . | . | . | 8·8 |
| 69·99—65 | " | . | . | . | 9·1 |
| 64·99—60 | " | . | . | . | 9·4 |
| 59·99—55 | " | . | . | . | 9·4 |
| 54·99—50 | " | . | . | . | 9·6 |

If then seed is bought under a guarantee that it will show a germination of 75 per cent., and the analysis shows that it is 1 per cent. lower, it may well be assumed that the sample is substantially what it was represented to be.

During the season 1911-1912 very few objections had to be raised with regard to the germinating capacity of members' seed samples. A few analyses have been made of the seed available for the coming season, and so far as there have been opportunities of forecasting its quality it seems probable that some of it will prove unsatisfactory. The samples of wheat and barley tested up to the present show a considerably impaired germinating capacity, and oats, which have had to contend with a severe frit-fly epidemic, as well as bad harvest conditions, may well prove strikingly deficient in this respect.

The enquiries with regard to the management of grass land during the past season have been of more than ordinary interest, as they show very clearly the after effects of the prolonged drought of 1911. On many types of soils, but more

particularly on those lying on gravel, chalk and limestone, large patches of the herbage were "burnt out." In most cases the clovers, especially white clover, were completely killed. The better grasses failed to spread over these areas, with the result that the bare ground was occupied by seedlings of various kinds. The correspondence on the subject indicates that the commonest of these colonisers was soft brome grass—a species few care to see in any quantity amongst herbage—and the less harmful annual meadow grass. The soft brome grass sheds its seeds at about the time the more useful grasses are sufficiently mature for cutting, and if this is allowed to occur a good meadow may easily be much depreciated. As it generally dies after being cut whilst in flower members were recommended to mow the fields as early as possible. In two of the worst cases it was considered advisable to sow the bare patches with a suitable grass mixture, as the area was so great that gradual colonisation by the better grasses might have taken several years.

As in former years a number of enquiries have been dealt with on the formation of permanent and temporary pastures and also of lawns.

Suitable seed mixtures have been recommended for these various purposes.

FUNGOID DISEASES OF CROPS.

Potatoes.—The first specimen of the potato disease (*Phytophthora infestans*) was sent in at an unusually early date, namely, mid-June. Later on, at more normal times, numbers of specimens were received with enquiries as to whether it was too late to spray the crops in the hopes of checking the spread of the disease. Unfortunately the weather conditions in most parts of the country were very unsuitable for this purpose, and practically nothing could be done to check the spread of the epidemic. One disastrous spraying operation was reported on by a member who in his anxiety to check potato disease had sprayed the crop with a mixture made up of eight pounds of copper sulphate and ten of washing soda in forty gallons of water. The result was a yellowing and partial defoliation of all the plants so treated. On hearing this a trial of the mixture was made in order to watch its effects. Similar results were obtained, but a fresh crop of leaves was produced after the fall of the injured ones. These were at once attacked by the fungus.

"Curl" was reported by several members, and a change of seed, preferably from Scotland, recommended for the following season. No cases of "black scab" or "wart disease" have been received.

Since the lifting of the crop tubers attacked by *Bacillus solaniperda* and also by *Nectria solani* have been reported on.

Clovers.—*Sclerotia* similar to those of the fungus almost invariably found in cases of clover-sickness (*Sclerotinia trifoliorum*) occurred on specimens of lucerne and sainfoin taken from "plants" which had begun to die off in patches. On lucerne especially much damage appears to have been caused both on young and well established leys. The disease is known to extend rapidly during the late autumn and winter months. As a possible method of checking the progress of the disease the application of fresh lime is being tried on a large scale, and the use of one or two fungicides on a smaller scale. *Pseudopeziza trifolii*, a fungus responsible for the formation of dark brown spots on the leaves of clover, has also been received on specimens of lucerne. The attack according to the accompanying report was sufficiently severe to cause the leaves to fall before the end of July.

Wheat and other Cereals.—If the number of enquiries is any index the wheat crop must have suffered from the attacks of parasitic fungi more than is usually the case during the past season. In addition to such common diseases as rust, mildew, smut and bunt cases of loss through the attacks of *Septoria graminis* and *Cladosporium herbarum* have been investigated. Information was asked for with regard to a disease which had caused the almost complete destruction of the crop, but the enquiry came too late in the season for satisfactory investigations to be carried out.

Helminthosporium gramineum, the fungus responsible for "blindness" in barley, was again reported on. The disease, though usually overlooked, is undoubtedly extremely common. It can be prevented with certainty by steeping the seed in a dilute solution of formalin (one part in 160 of water) for five or ten minutes. If the grain has to be drilled before drying some allowance should be made for the fact that the grain swells under this treatment.

Roots.—In addition to the common swede mildew and finger and toe, *Pseudomonas destructans* and Botrytis, both causing a rapid decay of the root, were received for examination.

Fruit trees.—Several enquiries with regard to silver-leaf were answered. In the majority of cases the disease had attacked Victoria plums, whilst in one case apple trees were affected, and in another a laurel. As curative measures appear to be far from satisfactory, the destruction of the trees was recommended with the view of stopping the further spread of the disease. Peach curl, apple and pear scab and the grey rot (*Monilia*), were reported on on several occasions. An obscure malady popularly known as leaf-scorch of the apple, which has

been sent in from the Worcestershire and Wisbech fruit growing districts is now under investigation. So far all attempts to find a fungus capable of causing the disease, or, again, attempts to transmit it to healthy foliage have failed. It is hoped to continue the investigations next season.

Two cases of the American gooseberry mildew have been reported on. In one of these the disease had spread to red currants.

MISCELLANEOUS FUNGI.

Dry rot in floors and lath and plaster partitions formed the subject of an enquiry, and a specimen of the fungus causing it (*Merulius lacrymans*) was sent from Scotland, where it had been found in the open—a somewhat unusual occurrence.

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ANNUAL REPORT FOR 1912 OF THE ZOOLOGIST.

AS usual the variable weather conditions of the year were strikingly reflected from month to month in the applications for advice received by the Zoological department. This was, perhaps, most noticeable in the early summer, when dry-weather pests, and especially aphids of all kinds, began to be generally complained of, and seemed likely to do great harm. The succeeding wet weather introduced a new set of pests, but at least had the advantage of much mitigating the damage which had been anticipated. The subjoined notes give an idea of the scope of the work of the department during the year, call attention to the appearance of certain rather unusual injurious insects, and indicate the principal investigations which are being carried out, and the results so far obtained.

FOREST TREE PESTS.

Among forest insects the following have been the subject of enquiry:—Willow beetle, larch bug, elm and ash bark-beetles, larch tineid (*Argyresthia laevigatella*), large poplar longicorn, pine sawfly, pine shoot tortrix, pine beetle, cockchafer, garden chafer, and beech coccus. The list contains nothing new, but a few notes are appended on some of the insects. The absence of some pests is, moreover, noteworthy. There was no recurrence of the mysterious attack on Douglas firs by a geometer caterpillar, notified last year by Mr. Percy Rogers, and its identity remains unknown. Again no complaints have reached me from Members of the Society of the great

larch sawfly, though it would appear that this insect is increasingly troublesome in the north of England.

The wide distribution and common occurrence of *Argyresthia laevigatella* on larches is very remarkable in view of the fact that it was first recorded in England only five years ago, by Dr. Somerville and Mr. Bennett. There may be something in the suggestion that its work, when previously noticed, had been attributed to the familiar pine weevil. At all events it appears to be only too common now. Several instances in which poplar trees had been killed by the large poplar longicorn, *Saperda carcharias*, were reported. It is very likely that the work of this insect is often confused with that of the goat moth, which it roughly resembles. When a poplar tree is perforated by large borings without any goat-like smell, the presence of the beetle should be suspected. In its case the entrance holes will be all low down on the trunk, and the examination of a dead trunk shows that the burrows converge as they mount, all being near the middle of the wood at a few feet from the ground. The consequence of this method of working is that the tree is greatly weakened at its base, and it is not rare for one or more of a row of poplars to be blown down in a gale before the presence of a serious pest has been suspected.

This localisation of the entrance holes makes it much easier to combat the beetle attack than that of the goat moth, whether by the injection of insecticides in the case of infested trees, or by the protection of sound trunks. Protective applications need not extend to a greater height than five feet from the ground, and trees of which the lower part of the trunk has been daubed in June with a mixture of clay and cow dung are fairly safe. Such protective measures are particularly desirable in the case of poplar nurseries if any old poplar trees are near at hand.

Of course it is possible that the goat moth and the beetle may both be at work on the same tree, but a more frequent associate of the beetle in the poplar is the large "clear-wing" moth, *Trochilium apiforme*. It also works at the base of the trunk; indeed it often attacks and hollows out the larger roots which protrude from the ground. When the joint attack has proceeded at all far no extraordinary gale is required to snap the tree off short near the ground.

ANIMAL PARASITES.

In this section the dividing line between the veterinary and zoological departments is indefinite, and some of the applications received have been referred to the Royal Veterinary College. Advice has been given in the case of

such parasitic diseases as "gapes," warble-fly, sheep nose-fly, and sheep maggot-fly, and a considerable number of external parasites of fowls and farm animals have been sent for identification. One specimen received was a dead mouse, obviously affected by some disease of which the sender wished to know the nature. This was *favus* (a disease allied to ringworm), due to a fungus named *Achorion schoenesteinii*, and the case was not without importance, because human beings are liable to attack, and sometimes contract the disease from cats which have been playing with infected mice.

FARM AND GARDEN PESTS.

Among the corn pests the frit-fly in oats was the most prevalent. It was not only very destructive to the young plant in June, but recurred, as a second brood, in the ear. This second brood attack is well known on the Continent, and, indeed, according to Miss Ormerod, gave rise to the name "frit-fly," from the *frits*, or worthless grains of corn resulting from it, but in England oats seldom suffer from the fly except in the early stages of growth.

Gout-fly, common enough in barley in any year, was during the past season rather frequent in wheat. It is known, of course, that wheat is liable to attack, but I seldom receive complaints of it in that crop. The general prevalence of aphids in the dry weather of early summer extended to corn crops, and a case of barley failure occurred which seemed to be attributable to no other cause.

In July some sainfoin and clover crops attracted attention from the fact that the heads were infested with incredible numbers of yellow maggots. Examination showed these to be the larvæ of a midge (Cecidomyid fly), and they were doubtless those of the clover seed-midge, *Cecidomyia leguminicola*. This insect was recorded by Miss Ormerod in 1890, but I am not aware that it has ever done serious harm in this country. In the United States it is a well-known and dreaded pest to leguminous crops grown for seed, and from the cases brought to my notice last summer it was not difficult to realise its potentiality for injury. In America the treatment consists chiefly in cutting or feeding off infested clover early, before the grubs leave the heads and enter the ground to pupate.

The root and garden crop pests inquired about included celery-fly, mangold-fly, onion-fly, root maggots and various species of aphids. Cases of root-knot eelworm attack in cucumbers were also reported. Attention was again directed to pea-thrips, though this pest did not appear to be quite so prevalent as in some recent years. The history of the pea-thrips

in this country is rather curious. The few references to it to be found in works on economic entomology allude to it as *Thrips pisivora*, a name to which it has no claim. It is true that Professor Westwood so called it in an article in the *Gardeners' Chronicle* in 1880 (?), but he did not formally describe it, and the species is, therefore, merely nominal. Indeed such description as he does give seems to be founded chiefly on the larva. Until recently it has remained doubtful whether there is any pea-thrips *par excellence*, or whether peas are subject to the attacks of various members of the group, but that matter has been set at rest by our investigations at Cambridge. There is certainly one species which especially infests peas, and that species has been identified for us by Mr. C. B. Williams, of Rothamsted (who has paid particular attention to this group of insects) as *Frankiniella robusta*. In the Report of the Zoologist for 1908 the results of a partial investigation into its life history were given. The eggs were found, not loosely in the flower as previously stated, but embedded in the substance of the stamen-sheath, and there the larvæ were found in different stages of development till they emerged to feed upon the growing pod. Moreover the injury was shown to be caused by the insects sucking the sap of the pod—not by gnawing away its substance.

With the aid of Mr. Maulik, an advanced student at Cambridge, further investigations have been carried on during the past season. These have for the most part confirmed previous observations, but the eggs have been found elsewhere in the flower—especially in the substance of the petals.

Thrips are very fond of flowers, and almost any flower in the garden yielded specimens of pea-thrips (together with other species) during the period of attack. They seemed, however, to be mere visitors, and no injury appeared to be done except in the case of peas. There are still obscure points in the life history of this pest, especially with regard to its winter quarters. So frail an insect seems ill adapted to withstand the rigours of winter, and though a few examples have been proved to shelter under the loose bark of old pea sticks, these would hardly seem to account for the severity of the summer attack, and as yet we do not know the main source from which the pea attack is derived. The appearance of the injury due to this insect must now be familiar to everyone who grows garden peas, for it is rare to find a crop entirely free. In slight cases the pod is disfigured by whitish patches, for the most part situated near its two ends, but when the attack is severe the pod is much discoloured and distorted, presenting generally a leprous appearance, and sometimes entirely arrested in its development.

FRUIT PESTS.

Advice has been given with regard to numerous fruit pests, and some of the cases reported have presented points of interest, and may be briefly commented upon.

In a case of apple-sucker attack reported by one correspondent, the disease was confined to the Ecklinville seedling variety, while Warner's King and Lane's Prince Albert, with which the Ecklinvilles were alternated, apparently escaped. There seemed to be no unsuitability in the soil, for a few years ago the trees bore well and even now their leaf-growth and general health seemed quite satisfactory, but the blossom was annually destroyed, while the other varieties thrive as well as ever.

A bad attack of the plum fruit saw-fly was reported in June from the Windermere district. This insect must not be confounded with the "slug-worm" which devours the leaves, nor with the red moth caterpillar which often infests the fruit. The grub of the saw-fly, whose scientific name is *Hoplocampa fulvicornis*, is creamy white, and has seven pairs of sucker-feet, while the moth caterpillar has only five. The grub bores into the fruit, the same grub attacking and destroying several plums in succession, till the ground is littered with abortive fruit. When full fed, the grub enters the soil and surrounds itself with a finely woven cocoon. In its treatment, two measures are very clearly indicated. The fruit should be swept up and destroyed as fast as it falls, so that as many of the grubs as possible may be prevented from attaining their winter quarters; and, where practicable, the ground beneath the trees should be dressed in the winter with some substance calculated to kill the pupæ in the soil. From the same district came a notice of the presence of *Thrips pyri* attacking apple leaves. This pest has only been observed in England of recent years.

Currant gall-mite, red-spider and codlin moth have, as usual, figured among the fruit pests reported, and winter-moth was again troublesome. In some cases where trees had been banded to keep off the winter-moth it was clear that the preparation employed had been ineffectual. In one case this fact was demonstrated by placing bands of a more satisfactory material above those originally used, when numbers of winter-moths which had negotiated the first obstacle were caught by the second. Of the sticky substances experimented with, by far the most effectual was the American preparation, "Tangle-foot." The greater cost of this preparation deters many fruit growers from using it, but after all it should be considered whether anything is gained by using a cheaper substance which is very much less efficient. Banding which does not effect its object is clearly a waste of time and money.

Four of the fruit pests inquired about have been enemies of the raspberry plant:—the gall-midge, the raspberry weevil, the bud-moth and the raspberry-beetle. The work of the gall-midge, *Lasioptera rubi*, is peculiar, and perhaps more disfiguring than seriously injurious, though it is capable, on occasion, of doing considerable harm. The diseased canes show brown irregular swellings, which, on being opened, are found to contain orange-coloured maggots. The midges lay their eggs in June and the resultant grubs bore into the bark, where in the course of a few weeks the swellings or galls begin to appear. The winter is passed in the grub stage, but in spring pupation takes place—still in the galls—and the flies come out at the end of May or the beginning of June. It is advisable to cut off and burn these galls as soon as ever they are observed.

The raspberry weevils (various species of *Otiorrhynchus*, but especially *O. picipes*) do harm in a variety of ways. Their grubs injure the roots of the plant, while the adult weevils gnaw the young bark, perforate the leaves, and, worst of all, attack the blossoms and injure or destroy the developing fruit. And the cause of injury may well escape observation, for all the work above ground is performed at night. The pest is best combated by clearing the soil of dead leaves and hoeing in soot and quick lime, and by shaking down the beetles at night on to tarred boards or into vessels containing paraffin. This operation must be performed carefully, for the weevils drop when a light is flashed upon them, and many will escape before the tarred boards are in position unless the lamp is properly managed.

The raspberry bud-moth is annually responsible for a large amount of damage, and many buds killed by it and containing the characteristic small red caterpillar may often be noticed on raspberry canes. The ground should be treated as in the case of weevil attack, and it is particularly important to remember that many of the insects hibernate in the supporting stakes, which should be dispensed with, if possible, where the pest occurs, or at all events removed and burned and replaced by new stakes in the winter.

It was stated in last year's report that the attempts to throw further light on the life history of the raspberry beetle, *Byturus tomentosus*, had practically failed. All endeavours to rear the insects from infested fruit in the laboratory were unsuccessful, and the results obtained from the experimental sheds erected over infested plants in the open were scanty. This summer the problem was attacked in another way, and it seems now likely to be solved. Six raspberry plants were grown in six large flower pots under natural conditions and

allowed to blossom. Then fifty raspberry beetles were admitted to each, and the plant and flower pot entirely enclosed in a muslin bag. The idea was to remove one plant at a time to the laboratory, at intervals of about a month, and, by thorough examination of everything within the muslin bag, to determine precisely where and in what condition the insect was at the time of examination. The investigation still continues, but even as far as it has gone, it has entirely disproved some of the statements to be found in all the text-books. For instance, it is asserted that the larvæ, on leaving the fruit, shelter, among other places, under loose bark, spin a cocoon, within which they turn to pupæ, and remain in this condition until the following spring. As a matter of fact they shelter in the soil and nowhere else; they spin no cocoon, but the pupa is naked and white; and they very soon begin to turn to beetles.

In the soil of a pot examined on August 21 numerous larvæ and a few pupæ were found at an average depth of about $1\frac{1}{2}$ inches. In the next pot, examined on September 25, no larvæ were found, but numerous pupæ and two beetles, evidently recently emerged. A month later the beetles—pale coloured but active—were numerous. It remains to be discovered whether they simply stay beneath the soil as beetles till next May, or whether they have any special object in attaining the active mature form so many months before the raspberries are ready to be attacked.

One point of practical importance is at least clear: the proper time to treat the soil with the view of eradicating the pest is immediately after the fruit has been gathered, and not in the winter, as is generally suggested. Various insecticides for this purpose were experimented with this summer, and will, I hope, be reported on next year.

MISCELLANEOUS NOTES.

From time to time various preparations are launched upon the market warranted to do remarkable things in the way of preventing or arresting the attacks of injurious insects, and recently the *Ferments Ortel* have been widely advertised. There are four brands of the ferments, and it is claimed for them that they attract to their destruction special types of injurious insects—fruit pests, vine pests, vegetable and flower pests and biting flies respectively. One is instructed to place some of the ferment (in the form of a paste) in a kind of wasp-bottle, add a little water, and hang it up in the appropriate *milieu*, and straightway the objectionable insects will flock to it, and the useful insects leave it severely alone. The instructions include details of the number of bottles to be used to the acre! Such a claim seemed hardly deserving of serious

consideration, but, nevertheless, it was determined to give the ferments a fair trial, and the fruit-tree brand was tested in an apple tree and the vegetable brand in the midst of peas surrounded by various garden vegetables. Certainly insects were attracted—though not greatly more than to the control bottles of sugar and water—but there was absolutely no connection between the captured insects and the plant desired to be protected, except that a good many wasps were trapped. Not a single codlin moth was taken, though the apples proved later to be rather badly attacked by this pest, nor were any of the recognised pea pests caught, though several asserted their presence during the summer. Besides wasps the insects captured were chiefly flies of no particular importance, with a good sprinkling of useful carnivorous beetles.

Spiders are essentially carnivorous, and in some cases of insect attack they have been proved to be distinctly useful in reducing the pest. It was a surprise to me, therefore, when I heard from Mr. F. V. Theobald that a spider had been observed deliberately tearing up the blossoms of the cucumber plant. The matter had been reported to him, and the fact had been verified by him in his own study. The spider, which he kindly sent for identification, proved to be *Marpessa muscosa*, the largest of our British jumping spiders, fairly common in the south of England. Its object in performing this extraordinary act appears to be to gain access to the nectar, which it sucks greedily.

During the summer and autumn of 1911 and the spring of 1912 an important investigation of the food of certain birds was carried out under my direction at the Cambridge School of Agriculture, though the credit for nearly all the laborious work entailed belongs to Mr. John Hammond, to whom the investigation was entrusted. The idea was to obtain a uniform supply of the birds in question from a given district during every month of the year, with a view to estimating their bearing on agriculture the year through. The programme was very completely carried out with regard to the feeding habits in East Anglia of the starling and the lark—two birds about which there is often a difference of opinion, and the feeding habits of which are believed by some to have lately undergone considerable modification.

The detailed results of the investigation are to be found in the *Journal of Agricultural Science* for 1912.

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THE WOBURN EXPERIMENTAL STATION OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

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FIELD EXPERIMENTS, 1912.

IF the season 1911 was rightly described, in my last annual Report, as one of very exceptional nature, the same may with equal truth be said of that of 1912. In place, however, of a prolonged drought, as in 1911, the season was characterised by continuous rain through summer and early autumn, and almost entire absence of sun and warmth. As a consequence, grain crops were long in coming to maturity, and, when harvest approached, in some parts of the country—and notably the Midlands (in which the Woburn farm is situated)—rain was so continuous as to make the in-gathering of the corn crops a matter of great difficulty and anxiety. As a single instance, by way of proof, it may be pointed out that out of the thirty-one days of August there were no less than twenty-six on which rain fell at the Woburn farm. It is unnecessary—for it is too well known—to refer to the great losses which farmers in the Midland counties, in particular, suffered, and we suffered in common with them. For the first time, I think, in the history of the farm, the experimental wheat and barley crops had to

be cut and threshed out forthwith, without allowing them to remain in the stack. Wheat, which was ready earliest, began to sprout in the sheaves, and would have been entirely spoilt if it had been put into the stack. It was therefore considered advisable to thresh out the grain at once; barley, which was not ripe early in August, was allowed to stand during the heavy rain of that month, and was not cut until September, when it, too, was threshed out at once, like the wheat.

Under such circumstances, not only were the yields poor, but the quality of the grain was very inferior, and, though valuations of the corn from the different plots of continuous corn-growing were made as usual, little importance can be attached to these, for the grain, with a few exceptions, was bad throughout.

On the other hand, both root crops and grass stood the adverse conditions better, and, fortunately, an abundant hay crop was gathered in in good condition, while root crops were unusually satisfactory for this light land farm.

CONTINUOUS GROWING OF WHEAT (*STACKYARD FIELD*) 1912 (36TH SEASON).

No alteration in the general plan pursued during the last few years was made, except for the addition of 5 cwt. per acre of lime to plot 2aa, which had been given a similar amount in each of the years 1905, 1909, 1910. Accordingly, the total application to this plot has been 1 ton per acre, but given in four different dressings of 5 cwt. each.

The usual cultivation operations were carried out after the harvest of 1911, and on October 13 farmyard manure (giving 100 lb. ammonia per acre) was spread and ploughed in on plot 11b.

On November 2, "Square Head's Master" wheat was drilled in at the rate of 9 pecks per acre, and on the same day mineral manures (superphosphate and sulphate of potash) were given to plots 4, 5, 6, 8, 9 and 10a.

The wheat appeared by December 2, and, on the whole, stood well through the winter, the farmyard manure plot looking, as usual, much the best.

On April 9, 1912, rape dust (giving 25 lb. ammonia per acre) was applied to plot 10b, and sulphate of potash to plot 11a.

Nitrogenous top-dressings of sulphate of ammonia and nitrate of soda were given on May 1 and May 28, the heavier dressings (to plots 3a, 8a, 8aa, and 9a) in two separate applications on the dates named, the lighter (to plots 2a, 2aa, 2b, 2bb, 3b, 5a, 5b, 6, 10a and 11a) only on the earlier date.

Throughout June the plots looked well, though already it seemed as if nitrate of soda was not going to give as good

crops as sulphate of ammonia. Also the rape dust on plot 10b, which up to then had been distinctly behind the farmyard manure (plot 11b), now began to be quite equal to the latter ; this improvement lasted up to the end.

Continued absence of sun, together with rain, delayed the proper ripening of the grain, and it was not until August 13 that the plots could be cut. Even then, as already stated, the sheaves never got really dry, and the result was that the corn began to sprout in the shocks. The wet condition of the crop prevented any hope of it drying in the stack, and, to save it, the wheat was carted on September 3 and threshed out at once.

The harvest results are given in Table I. (page 300).

The harvest results were, on the whole, slightly above those of the dry season, 1911, the highest produce obtained being 23·9 bushels as against 21·8 bushels per acre in 1911. The average of the two unmanured plots was 8·2 bushels, the same as in 1911, mineral manures alone giving 7·8 bushels. The most remarkable feature was the superiority of the plots dressed with sulphate of ammonia to those to which nitrate of soda had been given. This was the case whether the salts were used alone or in combination with minerals ; all along, the sulphate of ammonia plots had a far more healthy appearance and were far less subject to rust. Thus, while sulphate of ammonia with lime produced up to 17·5 bushels, and with minerals as well 23·9 bushels, nitrate of soda alone gave only 8 bushels, and the heavier dressings less than the lighter applications. Once again, the use of lime told markedly, the plot 2b, where 2 tons per acre of lime were used—and that once only, in 1897—continuing to give a good return and more than plot 2bb, where a second dressing of 2 tons was given in 1905. The plot 2aa, to which 1 ton of lime per acre had altogether been given, but in four separate applications, produced only 1 bushel short of 2b and considerably more than plot 2bb, which had had 4 tons of lime per acre. The return from the heavy dressing of nitrate of soda along with minerals was very disappointing. As usual, a low weight of corn per bushel, with much tail corn, characterised the nitrate of soda plots. Farmyard manure gave a very small crop, inferior to that with rape dust (plot 10b), and the comparison of plots 10a and 11a led to the conclusion of last year, that phosphate was required rather than potash.

The figures are given for the corn valuation, but it must be pointed out that the wheats were all extremely bad, and much below the average of the district. Hardly any of them would be of use for milling, and it was only the existing high price of feeding stuffs that gave any value to them. All the samples contained grown corns, and they “ handled ” very badly.

TABLE I.—*Continuous Growing of Wheat, 1912*
(36th Season).

(Wheat grown year after year on the same land, the manures being applied every year.)

Stackyard Field—Produce per acre.

| Plot | Manures per acre | Head corn | | Tail corn | Straw, chaff, &c. | Value per quarter on basis of 34s. | |
|------|---|-------------------|-------------------|-----------|-------------------|------------------------------------|--|
| | | No. of bush. | Weight per bushel | Weight | | | |
| 1 | Unmanured | 9.1 | Lb. 54.0 | Lb. 29 | C. q. lb. 8 2 7 | s. d. 29 0 | |
| 2a | Sulphate of ammonia (=25 lb. ammonia) | — | — | 88 | 4 3 16 | 28 0 | |
| 2aa | As 2a, with 5 cwt. lime, Jan., 1905, repeated 1909, 1910 and 1911 | 16.6 | 53.7 | 92 | 16 2 2 | 28 0 | |
| 2b | As 2a, with 2 tons lime, Dec., 1897 | 17.5 | 54.5 | 88 | 15 0 16 | 29 0 | |
| 2bb | As 2b, with 2 tons lime (repeated), Jan., 1905 | 11.2 | 56.0 | 160 | 11 1 1 | 28 0 | |
| 3a | Nitrate of soda (=50 lb. ammonia) | 6.4 | 52.0 | 160 | 14 3 6 | 28 0 | |
| 3b | Nitrate of soda (=25 lb. ammonia) | 8.0 | 52.0 | 128 | 12 2 26 | 28 0 | |
| 4 | Mineral manures (superphosphate, 3 cwt.; sulphate of potash, $\frac{1}{2}$ cwt.) | 7.8 | 53.2 | 50 | 6 0 23 | 29 0 | |
| 5a | Mineral manures and sulphate of ammonia (=25 lb. ammonia) | 22.5 | 56.7 | 64 | 18 0 23 | 32 0 | |
| 5b | As 5a, with 1 ton lime, Jan., 1905 | 23.9 | 56.2 | 62 | 18 2 0 | 32 0 | |
| 6 | Mineral manures and nitrate of soda (=25 lb. ammonia) | 8.2 | 52.0 | 125 | 12 3 19 | 28 0 | |
| 7 | Unmanured | 7.3 | 54.0 | 29 | 7 2 22 | 29 0 | |
| 8a | Mineral manures and (in alternate years) sulphate of ammonia (=50 lb. ammonia) | 9.6 ¹ | 54.0 | 80 | 10 2 12 | 29 0 | |
| 8aa | As 8a, with 10 cwt. lime, Jan., 1905 | 22.3 ¹ | 56.0 | 140 | 21 0 20 | 29 0 | |
| 8b | Mineral manures, sulphate of ammonia (=50 lb. ammonia) omitted (in alternate years) | 4.8 ² | 52.0 | 104 | 6 0 13 | 28 0 | |
| 8bb | As 8b, with 10 cwt. lime, Jan., 1905 | 20.4 ² | 56.7 | 76 | 17 1 22 | 32 0 | |
| 9a | Mineral manures and (in alternate years) nitrate of soda (=50 lb. ammonia) | 6.6 ¹ | 52.0 | 118 | 16 2 2 | 28 0 | |
| 9b | Mineral manures, nitrate of soda (=50 lb. ammonia) omitted (in alternate years) | 4.8 ² | 53.4 | 88 | 5 3 21 | 29 0 | |
| 10a | Superphosphate 3 cwt., nitrate of soda (=25 lb. ammonia) | 13.2 | 53.7 | 150 | 14 2 24 | 29 0 | |
| 10b | Rape dust (=25 lb. ammonia) | 16.2 | 57.2 | 96 | 14 0 11 | 32 0 | |
| 11a | Sulphate of potash 1 cwt., nitrate of soda (=25 lb. ammonia) | 9.8 | 52.7 | 98 | 14 2 13 | 29 0 | |
| 11b | Farmyard manure (=100 lb. ammonia) | 12.5 | 54.5 | 116 | 14 1 24 | 29 0 | |

¹ Applied.² Omitted.

TABLE II.—Continuous Growing of Barley, 1912
(36th Season).

(Barley grown year after year on the same land, the manures being applied every year.)

Stackyard Field—Produce per acre.

| Plot | Manures per acre | Head corn | | Tail corn | Straw, chaff, &c. | Value per quarter on basis of 35s. | |
|------|---|-------------------|------------------|-----------|-------------------|------------------------------------|----|
| | | No. of bush. | Weight per bush. | Weight | | s. | d. |
| 1 | Unmanured | 9.6 | Lb. 49.5 | Lb. 24 | C. q. lb. 7 3 25 | 32 | 6 |
| 2a | Sulphate of ammonia (=25 lb. ammonia) | 3.6 | 48.0 | 24 | 2 1 18 | 27 | 6 |
| 2aa | As 2a, with 5 cwt. lime, Mar., 1905, repeated 1909, 1910 and 1912 | 7.7 | 50.0 | 36 | 10 1 20 | 27 | 6 |
| 2b | As 2a, with 2 tons lime, Dec., 1897, repeated 1912 | 15.1 | 50.0 | 88 | 10 0 8 | 27 | 6 |
| 2bb | As 2a, with 2 tons lime, Dec., 1897, repeated Mar., 1905 | 14.0 | 52.0 | 60 | 9 1 4 | 27 | 6 |
| 3a | Nitrate of soda (=50 lb. ammonia) | 7.7 | 50.0 | 32 | 11 1 20 | 27 | 6 |
| 3b | Nitrate of soda (=25 lb. ammonia) | 11.0 | 48.0 | 50 | 9 2 6 | 27 | 6 |
| 4 | Mineral manures (superphosphate 3 cwt., sulphate of potash $\frac{1}{2}$ cwt.) | 20.9 | 49.9 | 39 | 13 2 13 | 34 | 0 |
| 5a | Mineral manures and sulphate of ammonia (=25 lb. ammonia) | 6.6 | 52.0 | 20 | 9 1 24 | 33 | 0 |
| 5aa | As 5a, with 1 ton lime, Mar., 1905 | 22.7 | 50.0 | 64 | 16 3 26 | 34 | 0 |
| 5b | As 5a, with 2 tons lime, Dec., 1897, repeated 1912 | 27.2 | 51.0 | 72 | 19 1 18 | 33 | 6 |
| 6 | Mineral manures and nitrate of soda (=25 lb. ammonia) | 21.1 | 49.6 | 53 | 17 2 4 | 31 | 0 |
| 7 | Unmanured | 9.5 | 48.8 | 36 | 7 1 9 | 30 | 0 |
| 8a | Mineral manures and (in alternate years) sulphate of ammonia (=50 lb. ammonia) | 5.3 ¹ | 50.0 | 20 | 3 1 6 | 31 | 0 |
| 8aa | As 8a, with 2 tons lime, Dec., 1897, repeated 1912 | 32.8 ¹ | 49.9 | 80 | 22 1 6 | 32 | 6 |
| 8b | Mineral manures, sulphate of ammonia (=50 lb. ammonia) omitted (in alternate years) | 3.9 ² | 50.0 | 16 | 4 3 16 | 30 | 0 |
| 8bb | As 8b, with 2 tons lime, Dec., 1897, repeated 1912 | 22.1 ² | 50.0 | 60 | 17 2 18 | 32 | 6 |
| 9a | Mineral manures and (in alternate years) nitrate of soda (=50 lb. ammonia) | 20.9 ¹ | 49.7 | 96 | 21 1 2 | 31 | 0 |
| 9b | Mineral manures, nitrate of soda (=50 lb. ammonia) omitted (in alternate years) | 19.8 ² | 49.7 | 46 | 17 0 10 | 31 | 0 |
| 10a | Superphosphate 3 cwt., nitrate of soda (=25 lb. ammonia) | 17.0 | 50.6 | 82 | 14 2 19 | 31 | 0 |
| 10b | Rape dust (=25 lb. ammonia) | 18.3 | 49.8 | 60 | 14 2 25 | 31 | 0 |
| 11a | Sulphate of potash 1 cwt., nitrate of soda (=25 lb. ammonia) | 23.5 | 49.6 | 50 | 17 1 3 | 31 | 0 |
| 11b | Farmyard manure (=100 lb. ammonia) | 25.1 | 51.0 | 38 | 21 1 2 | 35 | 0 |

¹ Applied.

² Omitted.

CONTINUOUS GROWING OF BARLEY (*STACKYARD FIELD*)
1912 (36TH SEASON).

During the winter, and subsequent to the first ploughing in October, a quantity of spurry showed itself on the plots 2, 5, and 8, but not on the limed plot 5aa. As, however, on the previously limed plots 2aa, 2b, 5b, 8aa, and 8bb the influence of lime appeared to be exhausted, further applications of lime, in the same respective quantities as before, were given to these plots on March 26, 1912. The land was ploughed a second time April 5-8, and farmyard manure (giving 100 lb. of ammonia per acre) spread and ploughed in on plot 11b. "Goldthorpe" barley, at the rate of 9 pecks per acre, was drilled on April 9, mineral manures being applied on the same day to plots 4, 5, 6, 8, 9, 10a, and 11a, and rape dust (25 lb. ammonia per acre) to plot 10b. The barley came up well, and April continued dry and warm. On May 2 the first halves of the heavier nitrogenous top-dressings were put on plots 3a, 8a, 8aa, 9a, and the second halves on May 29. The other plots to receive nitrogenous top-dressings (plots 2a, 2aa, 2b, 2bb, 3b, 5a, 5aa, 5b, 6, 10a and 11a) had these given in a single application on May 29. The barley was slow in growth, and so continued throughout the month, the straw being very short. The farmyard manure plot looked much the best (in contradistinction to the wheat), and so continued till harvest. The nitrate of soda plots, as in the case of the wheat, were very ragged, and it was remarkable that now, for the first time, spurry began to show here. The re-limed plots 8aa and 8bb were quite good, and so had entirely recovered. A great deal of "smut" appeared in July. As already stated, the barley was allowed to stand through the wet weather of August, and it was not cut and harvested until September 10, the corn being threshed out direct on September 14. The harvest results are given in Table II. (page 301).

The average of the manured plots was 9.6 bushels per acre, a considerable advance on the very poor produce of 1911 (3.5 bushels). Mineral manures (plot 4), in spite of the prevalence of the weed *Equisetum arvense*, gave the unusually high return of 20.9 bushels, and the highest produce of all was 32.8 bushels from plot 8aa (sulphate of ammonia with minerals, after lime). The superiority of sulphate of ammonia generally, as a top-dressing, to nitrate of soda, which was so apparent this year with the wheat, was also shown with barley, though not to nearly the same extent. The heavier application of nitrate of soda (plot 3a) was not as good as the lighter (plot 3b), and the crops treated with this manure alone show distinct signs of failing both in the wheat and in the barley. The additions of minerals gave (plot 6) 10 bushels more. The influence of lime

was again very marked, the further application of 2 tons per acre to plot 2b restoring the plot to a considerable extent, as was also the case with 5b, 8aa, and 8bb.

The comparison of 10a and 11a confirmed the indication of last year that potash is more needed for barley than phosphate. Farmyard manure (plot 11b) gave a better return than rape dust (plot 10b), and the crop was the second highest of the series, though it did not produce the exceptional crop of 1911, when the season was so very dry. It is remarkable, however, that in 1912 the results of the application of farmyard manure on wheat and barley respectively were so very different, wheat being a comparatively poor crop and barley a good one.

The corn was valued as usual, and the figures are appended. They are, however, of little use, for all the samples were inferior barleys for an ordinary season, and most of them were very "smutty" as well.

ROTATION EXPERIMENTS.—THE UNEXHAUSTED MANURIAL VALUE OF CAKE AND CORN (*STACKYARD FIELD*).

(a) *Series C.* 1910, *Suedes*, fed on by Sheep with Cake and Corn respectively; 1911, *Barley*; 1912, *Green Crops*.

The barley of 1911 was, as mentioned in last year's Report, better by 5 bushels of corn and $3\frac{1}{2}$ cwt. of straw per acre after the corn-feeding (oats and barley) than after the cake-feeding (linseed and cotton). After the barley was cut, early red trifolium seed was drilled on August 23, 1911. It came up nicely, looked well through the winter, and was cut for hay on June 6, 1912. Rain then came, and the hay could not be carted until June 19-20, when it was weighed, giving the results set out in Table III.

TABLE III.—*Series C. Rotation Experiments—the Unexhausted Manurial Value of Cake and Corn. (Stackyard Field.)* 1912, *Trifolium*—after *Barley*, following *Suedes*, fed on :—

| Plot | Produce of Trifolium Hay per acre | | | |
|------|-----------------------------------|----|----|----|
| | | T. | c. | q. |
| 1 | Cake-fed plot | 1 | 16 | 2 |
| 2 | Corn-fed Plot | 1 | 19 | 1 |

Thus, the corn-feeding continued to show, in 1912, a slight superiority over cake-feeding. It was intended to grow a second green crop—rape—and to feed it on before putting in wheat. The land was ploughed after the trifolium—

July 2-19—and rape was drilled, but it grew very slowly, and did not give enough crop to feed on ; so it was ploughed in in October, and wheat was sown.

(b) *Series D. 1912, Swedes.*

This was the first crop of the new series on this land. The general plan of the experiment was set out in the Report for 1911 (Journal R.A.S.E., Vol. 72, 1911, pp. 394-5). From May 20 to June 8 dung was carted out and applied to the land, at the rate of 12 tons per acre. Three hundredweight of superphosphate and 1 cwt. of sulphate of potash per acre were then given as artificial manure for the swedes, and on June 8 swede seed (“Invicta”) was drilled. The plant came up well, and the crop was singled and set out on July 6. On July 25 a top-dressing of 1 cwt. per acre of sulphate of ammonia was given. Through the wet autumn the crop maintained itself well, there being a very even plant throughout. The swedes were pulled November 26-27 and weighed, the results being :—

| | Weight of roots per acre | | | |
|---|-----------------------------|----|----|-----|
| | T | c. | q. | lb. |
| Half plot, swedes to be subsequently fed on with cake | 14 | 0 | 2 | 24 |
| Half plot, “ “ “ “ “ “ corn | 16 | 15 | 0 | 0 |

These amounts were reduced so as to leave 12 tons per acre to be fed on each plot, the surplus swedes being carted off.

GREEN-MANURING EXPERIMENTS.

(a) *Stackyard Field. Series A.*

The two acres on which the green crops (mustard, rape, and tares) had been grown in 1911 and *fed* on the land by sheep (in contradistinction to Lansome Field, where the green crops are *ploughed* in) were ploughed up October 23-25, 1911, and, as the land still needed liming, 1 ton per acre of ground lime (Buxton) was given on November 25 to the upper part, and 2 tons of lump lime (Buxton) to the lower half. On December 4, 9 pecks of “Square Head’s Master” wheat per acre were sown over the whole area, and on December 8, 4 cwt. of superphosphate and 1 cwt. of sulphate of potash per acre were given. The wheat came up well and was quite a fair crop for the year, though there was little difference noticeable between the different portions. The wheat was cut on August 13, 1912, carted and threshed on September 3. The results are given in Table IV. As the upper and lower halves of the field were kept separate, the individual weights are given, the *a* plots (1a, 2a, 3a) being at the lower end of the field and the others at the upper end.

TABLE IV.—*Green-Manuring Experiment (Stackyard Field).*

Produce of Wheat per acre, 1912—after Green-crops.

| Plot | Manuring | Head corn | | | Tail corn | Straw, chaff, &c. | | | Value of corn per quarter on basis of 35s. | |
|------|----------------------|-----------|-------|-------------------|-----------|-------------------|----|-----|--|----|
| | | Weight | Bush. | Weight per bushel | Weight | | | | | |
| | | Lb. | | Lb. | Lb. | C. | q. | lb. | s. | d. |
| 1 | Tares fed on . . . | 1,106 | 20·1 | 54·9 | 11 | 13 | 3 | 27 | 29 | 0 |
| 1a | " " " " . . . | 980 | 17·6 | 55·8 | 11 | 11 | 3 | 23 | 31 | 0 |
| 2 | Rape fed on . . . | 1,181 | 21·1 | 56·0 | 16 | 14 | 3 | 1 | 31 | 0 |
| 2a | " " " " . . . | 1,173 | 20·8 | 56·3 | 22 | 14 | 1 | 13 | 31 | 0 |
| 3 | Mustard fed on . . . | 877 | 15·6 | 56·1 | 11 | 11 | 0 | 27 | 31 | 0 |
| 3a | " " " " . . . | 1,168 | 20·9 | 55·9 | 21 | 13 | 3 | 23 | 31 | 0 |

Taking the mean of the duplicate plots we find the following general result :—

| | | Produce per Acre | |
|------------------------------|--|------------------|------------|
| | | Head Corn | Straw, &c. |
| | | Bushels | c. q. lb. |
| After Tares fed on | | 18·8 | 12 3 25 |
| " Rape " " " " " | | 20·9 | 14 2 7 |
| " Mustard fed on | | 18·2 | 12 2 11 |

In this, the first wheat crop of the new series, accordingly, the best crop has been obtained from the growing of rape and feeding it on the land, the tares giving the next best return, and the mustard slightly less, a result different from that experienced in Lansome Field, where the green crops are ploughed in and not fed on the land. The experiment will be continued and green crops again grown in 1913, as it is of great importance to clearly ascertain in what the difference between the two fields lies, whether in the green crops themselves or in the respective operations of ploughing in or feeding on the land.

(b) *Lansome Field.*

The green crops having been grown in 1911 and ploughed in, "Square Head's Master" wheat—9 pecks per acre—was drilled November 2, 1911. As usual, at first the wheat looked better after the tares, but, as the season of 1912 went on, there was little doubt as to the wheat being best after mustard, and then after rape, the tares plot, as in previous years, clearly showing the smallest crop. These appearances were borne out at harvest time. The wheat crop was cut August 9, carted and threshed September 2. The results are given in Table V., page 306.

The average of the two "tares" plots was 10·2 bushels, of the "rape" 13 bushels, and of the "mustard" plots 16·8

TABLE V.—*Green-manuring Experiment (Lansome Field).*
Produce of Wheat per acre, 1912.

| Plot | Manuring | Head corn | | | Tail corn | Straw, chaff, &c. | Value of corn per quarter on basis of 35s. | |
|------|--|-----------|-------|------------------|-----------|-------------------|--|----|
| | | Weight | Bush. | Weight per bush. | Weight | | | |
| | | Lb. | | Lb. | Lb. | C. q. lb. | s. | d. |
| 1 | Tares ploughed in, with mineral manures. . . | 540 | 9.9 | 54.5 | 13 | 8 0 5 | 31 | 0 |
| 2 | Tares ploughed in, with lime | 577 | 10.4 | 55.2 | 13 | 7 3 18 | 31 | 0 |
| 3 | Rape ploughed in, with mineral manures. . . | 754 | 13.5 | 55.7 | 7 | 9 0 21 | 32 | 6 |
| 4 | Rape ploughed in, with lime | 714 | 12.6 | 56.7 | 7 | 8 3 17 | 32 | 6 |
| 5 | Mustard ploughed in, with mineral manures. . | 1,017 | 18.0 | 56.5 | 9 | 11 3 11 | 32 | 0 |
| 6 | Mustard ploughed in, with lime | 900 | 15.5 | 57.9 | 12 | 10 1 14 | 32 | 0 |

bushels of corn per acre. The limed plots did not, as in 1910, exceed the mineral manured ones.

Little can be said as to the quality of the corn, for it was all bad and much below average. On the whole, the wheat on Lansome Field was better than on Stackyard Field.

It is now proposed to take a second corn crop (in 1913) on Lansome Field after the wheat, instead of growing the green crops again and ploughing them in. The continuation of this experiment in conjunction with the series in Stackyard Field, where the green crops are fed on the land, will be watched with interest.

VARIETIES OF BARLEY.

Series B. Stackyard Field.

It was decided to compare, under the same conditions, two typical varieties of barley, Archer's "Stiff-straw" and Hallett's "Chevalier," and this not merely by growing the two kinds on adjoining large plots, but also by growing them on alternate small strips.

The "Archer" barley was kindly supplied by Mr. E. S. Beaven, of Warminster, Wilts, and the "Chevalier" was obtained direct from Major Hallett. Sugar-beet (manured with dung and artificials) had been grown on the land in 1911. On April 2, 1912, the barleys were drilled at the rate of 8 pecks per acre. There were sixteen strips, each about $\frac{1}{16}$ acre in size and having twelve rows of corn. The series commenced with a strip of "Archer," then one of "Chevalier"

followed, then another of "Archer," and so on for all the sixteen strips. After this there came one large area— $\frac{1}{2}$ acre—of "Archer," and then a $\frac{1}{2}$ acre block of "Chevalier." On May 23, clover and grass seed mixtures (to form the experiment of 1913) were drilled in the barley. The "Chevalier" was the more forward, and came into ear on June 22, being fully in ear by June 27, when the "Archer" began to "ear." The crops were cut on September 10, threshed and weighed on September 14, and the results are given in Table VI.

TABLE VI.—*Varieties of Barley*, 1912.

Stackyard Field. Produce per acre.

| | | Head corn | | | Tail corn | | | | Value of corn per quarter on basis of 35s. |
|--------------------------------|----|-----------|-------|------------------|-----------|-------------------|----|-----|--|
| | | Weight | Bush. | Weight per bush. | Bush. | Straw, chaff, &c. | | | |
| <i>Archer's "Stiff-straw."</i> | | | | | | | | | |
| SMALL STRIPS— | | Lb. | | Lb. | | C. | q. | lb. | s. d. |
| | 1 | 2,113 | 41.0 | 51.5 | 5.3 | 22 | 1 | 4 | 36 0 |
| | 3 | 2,246 | 43.4 | 51.7 | 4.9 | 23 | 0 | 15 | 36 0 |
| | 5 | 1,732 | 33.6 | 51.5 | 5.2 | 23 | 0 | 15 | 36 0 |
| | 7 | 2,183 | 42.6 | 51.2 | 5.3 | 25 | 0 | 8 | 37 6 |
| | 9 | 1,523 | 29.4 | 51.7 | 5.3 | 28 | 0 | 0 | 37 6 |
| | 11 | 1,813 | 35.2 | 51.5 | 5.7 | 25 | 3 | 1 | 36 0 |
| | 13 | 2,025 | 39.3 | 51.5 | 5.7 | 24 | 1 | 7 | 37 6 |
| | 15 | 2,361 | 45.8 | 51.5 | 6.2 | 25 | 3 | 1 | 37 6 |
| LARGE PLOT— | | | | | | | | | |
| | 17 | 2,113 | 41.0 | 51.5 | 4.6 | 26 | 0 | 4 | 36 0 |
| <i>Hallett's "Chevalier."</i> | | | | | | | | | |
| SMALL STRIPS— | | | | | | | | | |
| | 2 | 1,642 | 31.9 | 51.5 | 3.9 | 24 | 0 | 5 | 38 0 |
| | 4 | 1,855 | 36.0 | 51.5 | 3.4 | 23 | 2 | 27 | 38 0 |
| | 6 | 1,536 | 29.5 | 52.0 | 3.1 | 23 | 2 | 19 | 38 0 |
| | 8 | 1,617 | 31.2 | 51.7 | 2.8 | 30 | 3 | 7 | 37 0 |
| | 10 | 1,357 | 26.5 | 51.2 | 3.8 | 27 | 1 | 20 | 36 0 |
| | 12 | 1,910 | 36.9 | 51.7 | 4.1 | 28 | 2 | 25 | 35 0 |
| | 14 | 1,702 | 32.9 | 51.7 | 4.3 | 27 | 3 | 2 | 36 0 |
| | 16 | 2,093 | 40.5 | 51.5 | 3.9 | 26 | 1 | 17 | 36 0 |
| LARGE PLOT— | | | | | | | | | |
| | 18 | 1,668 | 32.3 | 51.5 | 3.3 | 22 | 3 | 7 | 36 0 |

Taking the results as a whole, it will be seen that the Archer's "Stiff-straw" gave from 8 bushels (small plots) to 10 bushels (large plots) of total corn more per acre than did the "Chevalier." There was more tail corn, however, from the "Archer" variety. The quality of the grain of these lots was

much better than that of any other corn grown on this land, the valuer's (Mr. T. Smith, junr., of Bedford) remarks being that the samples were well threshed and well above the average for the district. They were, indeed, some of the nicest barleys he had seen this season, being uniform in colour and size. As between the two varieties, he thought that, while the bolder grain of the "Hallett's" would tell with some buyers, the beautiful skin and "curl" on most of the "Archer's" would be more to valuers' liking.

Comparing next the produce of each variety on the large plots with that on the small strips, it may at once be said that the season was certainly not a favourable one for making a close comparison of this kind. A review of the returns for individual plots, as set out in Table VI., will show that there was in some cases a wide divergence between the yields of different strips of one and the same variety. Yet, if the whole yields be added up and averaged, it will be found that the "Archer" barley when grown on strips gave an average of 38·8 bushels of head corn and 5·5 bushels of tail corn per acre, or a total of 44·3 bushels of corn—as against a total of 45·6 bushels per acre of corn on the large plot; while the "Chevalier" gave, on the strips, an average of 33·2 bushels of head corn, and 3·6 bushels of tail corn per acre, or a total of 36·8 bushels of corn, as against a total of 35·6 bushels of corn on the corresponding large plot. Hence the divergence in any one variety between the produce of strips and that of large plots was only about 1 bushel of corn per acre in either case. In the one case ("Archer") the large plot gave the higher return, and in the other ("Chevalier") the strips. Accordingly, the difference between the returns for either variety, as between the large plots and the small strips, may be put at $\pm 2\cdot7$ per cent. only. The general result as between the two varieties which it was the object of the experiment to compare, shows the yield of the "Archer" barley to have been quite $8\frac{1}{2}$ bushels of corn per acre more than that of the "Chevalier," and that the grain was not inferior in value.

VARIETIES OF WHEAT.

(a) *Lansome Field.*

(b) *Road Piece Field.*

Further trials were given in 1912 to French wheats, as also to Prof. Biffen's "Little Joss," and to the Dutch wheat "Wilhelmina," as compared with the English wheat "Square Head's Master," generally grown on the farm. Of the two fields, Lansome Field is distinctly the lighter and poorer soil, being entirely on the Lower-Greensand, whereas Road Piece

Field is just at the junction of this latter with the Oxford Clay formation.

In Lansome Field the wheats followed potatoes manured with dung, and were drilled on November 2, 1911; on Road Piece Field they came after mangolds, also manured with dung, and were drilled on November 23, 1911. No further manuring was done in either case. The wheat was cut August 9-10, 1912, and carted and threshed September 2. Of the different varieties grown, the seed of the two French varieties, "Hatif Inversable" and "Jolly Farmer," had been obtained direct from M. Vilmorin, Paris; the former, it appeared, is the same wheat as that known as "Sensation," and the latter is the same as the "Bon Fermier." Prof. Biffen supplied the "Little Joss," and the "Sensation" wheat was some which had been grown the year before by Mr. Luddington in the Cambridge-shire fens, so that it was French wheat acclimatised by growth in England. The harvest results are set out in Table VII.

TABLE VII.—*Varieties of Wheat, 1912.*
Lansome Field and Road Piece Field—Produce per acre.

| Varieties | Head corn | | | Tail corn | Straw, chaff, &c. | Value of corn per quarter on basis of 35s. |
|----------------------------------|-----------|-------|------------------|-----------|-------------------|--|
| | Weight | Bush. | Weight per bush. | Weight | | |
| LANSOME FIELD. | | | | | | |
| "Square Head's Master" (English) | Lb. 1,288 | 22.2 | Lb. 58.0 | Lb. 12.2 | C. q. lb. 14 1 0 | s. d. |
| "Hatif Inversable" (French) | 801 | 14.1 | 56.8 | 8.7 | 8 1 8 | |
| "Jolly Farmer" (French) | 1,250 | 21.4 | 58.4 | 35.8 | 14 2 17 | |
| "Little Joss" (Biffen's) | 1,584 | 27.1 | 58.4 | 12.5 | 18 2 3 | |
| "Sensation" (French-acclimated) | 1,372 | 23.3 | 58.7 | 9.6 | 14 3 5 | |
| ROAD PIECE FIELD. | | | | | | |
| "Wilhelmina" (Dutch) | 1,523 | 27.5 | 55.2 | 25.6 | 18 3 8 | 29 6 |
| "Sensation" (French-acclimated) | 1,475 | 26.0 | 56.7 | 10.6 | 18 3 15 | 32 0 |
| "Little Joss" (Biffen's) | 1,891 | 32.9 | 57.4 | 15.0 | 24 0 6 | 32 6 |
| "Jolly Farmer" (French) | 1,580 | 27.3 | 57.8 | 14.4 | 19 2 2 | 32 6 |
| "Hatif Inversable" (French) | 1,977 | 33.8 | 58.4 | 25.0 | 22 0 9 | 31 6 |
| "Square Head's Master" (English) | 2,182 | 36.2 | 60.14 | 30.0 | 27 1 18 | 33 0 |

The yields in Road Piece were distinctly higher than those in Lansome Field, the soil being richer. Taking the results of the two fields together, it will be seen that "Square Head's Master" and "Little Joss" came out well above the others, "Little Joss" giving an average of 30 bushels of corn per

acre, "Square Head's Master" 29·5 bushels, and the other three 24·25 bushels, while the single plot of "Wilhelmina" yielded 27·5 bushels per acre. There was no striking feature about the straw, but, on the valuing of the grain, "Square Head's Master" came out rather the best, the grain being fairly well matured, while the "Little Joss" was described as "a useful wheat, but lacking the 'bloom' and condition of the 'Square Head's Master.'" The "Wilhelmina" corn was the poorest, and useless for milling.

On the whole, these experiments speak very well for "Little Joss," although its superiority to the local variety "Square Head's Master," either in regard to yield of corn or straw, or quality of grain, has not been made out. Nor would the acclimatisation of the French wheat ("Sensation") seem to have materially improved it.

VARIETIES OF LUCERNE.—*STACKYARD FIELD.*

The details of the sowing of these are given in last year's Report (Journal R.A.S.E., Vol. 72, 1911, page 398), the different varieties having been sown in the spring of 1911, one half of each in a barley crop, the other half without a covering crop. As then mentioned, the plots sown without crop looked, after harvest, distinctly better than those put in under barley, though the plots were not so clean. Of the different varieties the two American ones seemed the best, and then the Canadian. The plots were hoed January 3-17, 1912, but frost, coming then, pinched the lucerne a good deal. On April 10, a dressing of 4 cwt. per acre of superphosphate and 5 cwt. per acre of rape dust was given. The lucerne grew fairly, and on August 7 it was cut and made into hay, being carted and weighed August 15-16. The weights are given in Table VIII.

TABLE VIII.—*Varieties of Lucerne (Stackyard Field).*

Produce of Hay per acre, 1912.

| Variety | Sown under a corn crop | | | Sown bare | | |
|------------------------------|------------------------|----|-----|-----------|----|-----|
| | Cwt. | q. | lb. | Cwt. | q. | lb. |
| American (Arizona) | 8 | 2 | 0 | 15 | 2 | 0 |
| Canadian | 9 | 2 | 0 | 20 | 2 | 0 |
| Turkestan | 6 | 0 | 0 | 11 | 0 | 0 |
| Provence | 9 | 2 | 0 | 19 | 0 | 0 |
| Russian (Europe) | 24 | 2 | 0 | 37 | 2 | 0 |
| Russian (Asia) | 9 | 0 | 0 | 16 | 2 | 0 |
| North American | 9 | 2 | 0 | 17 | 2 | 0 |

The first point that comes out prominently is that the produce all round was nearly doubled by sowing the lucerne "bare." Next, as between the different varieties, the Russian (Europe) lucerne gave far and away the largest crop, the

average being 31 cwt. of hay per acre as against 15 cwt. from the Canadian seed, this coming next in order. Provence (14.1 cwt.) and North American (13.5 cwt.) were but little behind, and the poorest of all was the Turkestan (8.2 cwt.). This experiment will be carried on further.

VARIETIES OF RYE-GRASS (*STACKYARD FIELD*, 1912).

In the spring of 1911 three small plots were sown (May 12) in Stackyard Field with different varieties of rye-grass, viz., Italian rye-grass, Pacey's rye-grass, and a new Dutch variety. The grasses came up, but, owing largely to the very dry season, there was practically no crop to cut the first year, and the plots were carried on to 1912. The only noticeable point in the first year was that the Dutch variety was distinctly earlier than the others. In 1912 the plots were cut for hay, the first crop on June 14 and the second on October 4. The results are set out in Table IX.

TABLE IX.—*Varieties of Rye-grass (Stackyard Field).*

Produce of Hay per acre, 1912.

| Variety | First crop | Second crop | Total |
|-----------------------|-------------|-------------|--------------|
| | T. c. q. lb | C. q. lb. | T. c. q. lb. |
| Pacey rye-grass . . . | 1 0 1 27 | 6 1 20 | 1 6 3 19 |
| Dutch „ . . . | 1 3 1 6 | 12 1 23 | 1 15 3 1 |
| Italian „ . . . | 1 18 3 25 | 12 3 12 | 2 11 3 9 |

Again, the Dutch variety came the earliest, but it will be seen that the yield of hay, though higher than that of the Pacey rye-grass, was not nearly equal to that of the Italian variety.

SOYA BEAN.

A small plot in Stackyard Field was utilised with the object of seeing whether soya bean would, as a crop, come to maturity in this country.

The seed was sown on May 22, 1912, and the plant grew quite well up to a point, but it never produced pods, and the first early frost (September 21) entirely destroyed the plant. This will be tried again in 1913 with earlier sowing of the seed.

LINSEED.

On another small plot in the same field linseed was similarly sown on May 22, 1912. The plant came up well, and formed seed duly. This was harvested on October 4; the yield of clean linseed was, however, small, being only $4\frac{1}{4}$ cwt. per acre with 17 cwt. of straw per acre. Analysis of the seed showed it to contain 34.8 per cent. of oil.

INOCULATION OF LEGUMINOUS CROPS.

The last series of small plots in Stackyard Field comprised the trial of a new inoculating material emanating from America. It would be more rightly described, perhaps, as the outcome of a *new method of preparation* of inoculating materials, rather than as a new material itself. The method—as distinct from those hitherto adopted, of keeping the culture obtained from the nodules of leguminous plants in air-tight receptacles, or of absorbing it in cotton wool, earth, &c.—consists in allowing air to enter after being filtered through cotton wool. This method seems to me to possess possible advantages, as there is little doubt in my mind that the practical failure of inoculating cultures hitherto has been associated with some faulty step in their preparation whereby their vitality has been impaired. It was with the object of seeing whether the new method of preparation got over some of the difficulties experienced in the past, that I undertook to give it a trial. The plan of applying the material—by steeping the seed in it before sowing—is just the same as that generally adopted. In Stackyard Field I set out six small plots, sowing, on two of them, lucerne seed, on two, red clover seed, and on other two, white clover seed. In one case the seed was sown direct, in the other the seed before being sown was allowed to soak in the culture preparation, was then air-dried and sown. This was on May 25, 1912. The several lots came up quite well, and throughout the time of growth did not exhibit any marked difference except possibly in the case of the white clover, where the inoculated seed certainly seemed to give the better crop. The crops were allowed to grow until October 4, when they were cut and weighed green. The results are given in Table X.

TABLE X.—*Inoculation of Leguminous Crops.*

Stackyard Field—Green Produce per acre, 1912.

| | Seed not inoculated | | | | Seed inoculated | | | |
|------------------------|---------------------|----|----|-----|-----------------|----|----|-----|
| | T. | c. | q. | lb. | T. | c. | q. | lb. |
| Lucerne | 1 | 3 | 0 | 24 | 1 | 5 | 3 | 16 |
| Red clover | 3 | 17 | 2 | 20 | 4 | 5 | 2 | 24 |
| White clover | 1 | 4 | 0 | 12 | 1 | 8 | 2 | 8 |

The differences are not great, but such as they are they tell in favour of the inoculation, the crop being in each case slightly increased as the result of inoculating the seed before sowing it.

SUGAR-BEET.

In 1911 there was an extensive series of experiments conducted at the Woburn Farm on the growing of sugar-beet,

details of which are given in last year's report (see Journal R.A.S.E., Vol. 72, 1911, pp. 399-403). Though these were not now repeated *in extenso*, sugar-beet was grown again, the field being Warren Field, the soil of which is a fairly heavy loam. Questions having arisen, too, as to the loss of weight found in washing the beet free of dirt, particular attention was paid to this point. The field was manured with 10 tons per acre of London dung, and on May 8, 16 lb. per acre of "Klein Wanzleben" seed were drilled. The drills were 18 inches apart. The plants were singled and set out June 21-25, hoed July 10-12, and top-dressed on July 29 with 1 cwt. per acre of sulphate of ammonia. On October 2-10 the beets were pulled, they were then topped and cleaned in the ordinary way, and weighed. The roots subsequently were washed free of dirt and weighed again. Table XI. gives the produce, both as weighed in the field and after washing, and also, by way of comparison, the produce of mangolds ("Yellow Globe") on an adjoining plot.

TABLE XI.—*Sugar-beet (Warren Field).*

Weight of roots per acre, 1912.

| | Cleaned in field | | | Washed roots | | | Loss in washing |
|--------------------------------|------------------|----|--------|--------------|----|--------|-----------------|
| | T. | c. | q. lb. | T. | c. | q. lb. | |
| Sugar-beet ("Klein Wanzleben") | 18 | 11 | 1 20 | 13 | 0 | 0 0 | 30 |
| Mangolds ("Yellow Globe") | 28 | 13 | 2 7 | 24 | 19 | 0 0 | 13 |

From these figures it will be seen that the mangolds gave fully 10 tons more yield per acre than the sugar-beet. The yields with both crops, however, fall considerably below those of 1911, when 21 tons of sugar-beet and 44 tons of mangolds per acre were grown. The loss on washing the sugar-beet came out at 30 per cent. as against the 35 per cent. recorded in 1911, the corresponding loss with mangolds being 13 per cent. only, the same figure as given in 1911. There is little doubt that the season of 1912, though there was plenty of rain, was not nearly so good a one for the healthy growth and development of the root-crops as was the dry one of 1911. The roots were subsequently analysed, and gave the following results :—

| | Sugar-beet per cent. | Mangolds per cent. |
|--------------------------------|-------------------------|-----------------------|
| Water | 74·53 | 86·78 |
| Juice | 95·50 | 97·90 |
| Crude fibre | 4·50 | 2·10 |
| Total sugar in juice | 18·40 | 8·45 |
| " " roots | 17·57 | 8·27 |
| Purity of juice | 82·5 | 67·0 |

RAINFALL AT WOBURN EXPERIMENTAL STATION, 1912.
(292 ft. above sea level.)

| | Total Inches | No. of days with '01 in. or more recorded | | Total Inches | No. of days with '01 in. or more recorded |
|----------------|-----------------|--|-----------------|-----------------|--|
| January . . . | 3.55 | 20 | July . . . | 1.93 | 16 |
| February . . . | 1.56 | 18 | August . . . | 5.33 | 25 |
| March . . . | 2.69 | 21 | September . . . | 1.42 | 7 |
| April . . . | 0.06 | 2 | October . . . | 2.43 | 15 |
| May . . . | 1.77 | 13 | November . . . | 1.38 | 13 |
| June . . . | 2.81 | 21 | December . . . | 2.89 | 21 |
| Total . . . | | | 27.82 192 | | |

POT-CULTURE EXPERIMENTS, 1910-11-12.

I. Hills' Experiments :—

- (a) The influence of Lithium Salts on Wheat.
- (b) The influence of Zinc Salts on Wheat.
- (c) The influence of Lead Salts on Wheat.

II. The relation of Lime to Magnesia in Soils.

- (a) The addition of Magnesia.
- (b) The addition of Lime.

I. *The Hills' Experiments—(a) The influence of salts of Lithium on Wheat.*

For several years past the Woburn Pot-culture Station has been concerned in the investigation of the influence on plant life of some of those constituents which are only occasionally, or only in minute quantities, found in the soil. These investigations are the outcome of a Bequest made in 1896 by the late Mr. E. H. Hills, who freely stated his belief that these "rarer constituents" exercised a greater influence than was generally supposed. On the Society undertaking the work in accordance with the terms of the Bequest, considerable doubt was expressed as to whether any results of value were likely to be obtained. The work has, however, been diligently pursued, and the following account will, no doubt, show whether the pessimistic forecast, or, on the contrary, that of Mr. Hills, was the more correct. Suffice it to say, meantime, that, as the work has proceeded, points both novel and unexpected, and conveying interesting and valuable information have been brought out.

While many different substances coming under the heading "rare constituents" have been examined, there are some in particular which have been more closely followed than others, and amongst these come the salts of lithium. The information

which has been collected concerning these being now in a condition to set forth consecutively, it is the aim of the present note to do this.

The first experiment was made in 1898 with lithium chloride; this was repeated in 1900; in 1901 the oxide, carbonate and sulphate were also tried; in 1903 the oxide and the iodide. In the first three of these cases the salts were dissolved and poured on the surface of the soil; in 1903 they were mixed with the top layer of soil. The quantities, beginning at the rate of 5 cwt. per acre of the salts, were reduced in the successive experiments to 2 cwt., 1 cwt., and $\frac{1}{2}$ cwt. per acre; they were tried principally on wheat and barley, but also on mustard, peas, and clover. Further work was done in water-culture and in seed-soaking experiments. The general result of these trials (for the details of which see Journals R.A.S.E., 1900, 1901, 1902, 1904) was to show that all lithium salts applied in the above quantities either killed the crops outright, or else prolonged the period of incubation and ultimately produced a decreased crop.

In 1906 more systematic experiments were begun, and were confined to wheat and barley, the lithium salts being no longer given in solution, or mixed merely with the surface soil, but they were given so as to supply to the soil definite amounts of the metal lithium. For this purpose the salts were incorporated, by intimate mixing, with the whole of the soil used, so that the soil could be fairly represented as one containing a definite proportion of the metal. This method has, by experience, been found to be much more satisfactory than that of dissolving the salts and pouring them on the surface, or even that of mixing them with the top soil, inasmuch as there can be no doubt that the germinating seed or the young plant comes at times into contact with the salts in stronger concentration than intended, whereas when the salts are intimately mixed with the soil their distribution is more equal throughout. It is unnecessary to deal in detail with the earlier work of this new series. Suffice it to say that the endeavour was made to reach the point at which the metal, as represented by its different salts, might cease to produce a toxic effect. In 1906, lithium salts (chloride, sulphate, carbonate, and nitrate) were used supplying .05 per cent. of the metal to the soil used; in 1907, .0075 per cent., and in 1908, .00375 per cent. only (see Journal R.A.S.E., 1909, page 388). In all these cases lithium showed a marked prolonging of the period of incubation, the plants as they grew became more or less sickly, and ultimately a lessened crop was produced. Up to this point one could therefore say that lithium when present in the soil to the extent of .00375 per cent. exercised a distinctly toxic effect.

In 1909 the experiments were continued on wheat with the same salts but in lesser quantity, they supplying lithium at the rate of .0018 per cent. only. Now for the first time the lithium salts appeared to lose their toxic effect and to exercise in all cases a slightly stimulating effect. This, indeed, reached, in the case of the nitrate, a very high figure. Reference to the published details (Journal R.A.S.E., 1910, pp. 344-5) will show that the yields of corn were, with the chloride 119, the sulphate 115, the carbonate 115, and with the nitrate as much as 198, as compared with 100 for the untreated crop, and those of straw 101.6, 101.1, 101, and 163, respectively, against 100 for the untreated. Up to this point, accordingly, the general conclusion was reached that lithium salts, if used to an extent not supplying more than .002 parts of the metal lithium in 100 parts of the soil, would exert a stimulating influence upon the wheat plant, but that if the quantity of lithium went up to .003 per cent. a toxic effect was produced.

The striking increase recorded in 1909 from the use of lithium nitrate pointed to the desirability of repeating this experiment, and, as lithium phosphate had not been yet tried, it was decided to employ it also in future work.

From this date began an interesting series of experiments which, commencing with the use of lithium salts in 1910, gradually extended to that of zinc salt and of lead salts, and was continued throughout the three seasons 1910, 1911, 1912.

To enable the reader to follow better the course of the enquiry, it has been thought well to abandon the usual plan of giving each season's work in detail, and to deal consecutively with the story of experiment with each of the metals forming the subject of enquiry. Accordingly, a summary having been already given of the work with lithium salts up to 1909 (inclusive), the account is now continued for the years 1910, 1911 and 1912.

1. *Lithium phosphate.* 1910.

In 1910 a start was made with lithium phosphate on the wheat plant, the first question calling for answer being whether the metal lithium in this form would show the same toxic influence as it did in other salts. The proportions of the salts used were such as to provide respectively (a) .002 per cent., (b) .005 per cent., (c) .01 per cent. of metallic lithium in the soil. The lithium phosphate was intimately mixed with the whole of the soil (40 lb.) filling a pot, and each experiment was in duplicate. The salts were mixed with the soil on December 1, 1909, and the seed was sown on December 3. As compared with the control experiment, there was no apparent injury to germination, but the retardation in appearance of the shoots amounted to three or four days where the heavier

dressings of lithium had been used. Towards the end of February, 1910, there was a decided change visible, for whereas the plants receiving the small amounts of lithium remained green and seemed to show more chlorophyll activity than did the control plots, the plants to which, on the other hand, the heaviest applications of lithium phosphate had been given, were turned quite yellow. On thinning out the plants in March, 1910, there was also a clear difference between the roots of the several sets, for, while the smaller application of lithium ($\cdot 002$ per cent.) showed rather more development and stronger growth, the higher amounts produced a stunted root growth, with absence of fine root hairs, the leaf development also being poor. The plants were carried on until harvest, the usual measurements, weights, &c., being recorded. The chief points of interest are: (1) That the small addition of lithium ($\cdot 002$ per cent.) gave a slight increase in grain and straw as compared with the untreated lots, this being represented by the figures 115 and 113 respectively as against 100 for the untreated; the results as regards the intermediate amount ($\cdot 005$ per cent.) were not altogether conclusive or satisfactory. (2) That the heavy dressing ($\cdot 01$) reduced the yield of corn and straw by fully one-half.

Hence, lithium phosphate would seem to differ but little from the other lithium salts tried, in regard to its stimulating or its toxic influence. That is to say, up to $\cdot 002$ per cent. in the soil lithium would seem to be stimulating; above this it is more or less toxic.

2. Lithium Phosphate and Lithium Nitrate. 1911.

In 1911 the experiment of 1910 with lithium phosphate was repeated, and, as there had been uncertainty last time as to the effect of $\cdot 005$ per cent. lithium applied as phosphate, this quantity was again given, as also $\cdot 0075$ per cent., the smallest application being slightly increased, too, viz., from $\cdot 002$ per cent. to $\cdot 0025$ per cent. Thus the several applications were:—(a) $\cdot 0025$ per cent., (b) $\cdot 005$ per cent., (c) $\cdot 0075$ per cent., (d) $\cdot 01$ per cent. At the same time lithium nitrate supplying lithium in the several proportions just stated was also tried.

The general arrangements were as usual, each experiment being in duplicate and the lithium salts being intimately mixed with the whole of the soil in a single pot. The wheat was sown on December 3, 1910, twelve seeds being put in each pot, and then subsequently reduced to six growing plants per pot. At once it was seen that the lithium salts, one and all, exercised a marked influence on the germination of the grain. With the lithium phosphate or lithium nitrate in small amount

(.0025 per cent. lithium) the effect seemed to be one merely of retarding germination, for whereas by January 28 the control plots had ten or eleven of the twelve grains up, with lithium phosphate there were only six, and with lithium nitrate only five plants, though more appeared later on. But with all the higher amounts of lithium—whether as phosphate or nitrate—the germination was more and more affected as the salts were in more concentrated form, and the plants never reached their full number. More especially was this the case with lithium nitrate, no plants coming up at all where the heavier applications were given.

The appearances of the growing crops are shown in Plate 1 and Plate 4. It will be seen, in Plate 1, that the only lithium phosphate application equal to the “no treatment” (*a*) is that of .0025 per cent. (*b*), and that (*c*) is almost an entire failure, and (*d*) and (*e*) complete failures. Similarly, with Plate 4, (*a*) alone shows any increase over the untreated lot ((*a*) of Plate 1), while (*c*) and (*d*) are quite blanks.

On coming to thresh out and weigh the corn and straw the following comparative results were obtained :—

| | Corn | Straw |
|---|------|-------|
| No treatment | 100 | 100 |
| Lithium phosphate—.0025 per cent. lithium | 113 | 111 |
| .005 | 6 | 31 |
| Lithium nitrate — .0025 per cent. lithium | 142 | 178 |
| .005 | 3.4 | 31.5 |

On comparing these results with those of 1910 it will be seen that the two are closely alike as regards lithium phosphate when used up to .002 or .0025 per cent. lithium, and show that there is a slight stimulus up to this point. If, however, this quantity be materially exceeded then there is injury to the germinating seed, this being the more marked with the greater concentration.

As regards lithium nitrate, the results go to confirm to some extent the results found in 1909 as to a marked stimulative effect if .0025 per cent. of lithium be not exceeded; also that this action is more marked with the nitrate than with other salts of lithium. If, however, this quantity be exceeded, the effect is a toxic one, and more marked with the nitrate than with the phosphate.

3. *Lithium Phosphate, Lithium Nitrate, and Lithium Carbonate. 1912.*

On obtaining the results just set out, it was determined to see whether quantities of lithium markedly below .003 per cent. produced a stimulating effect. In addition to the phosphate and nitrate as before, lithium carbonate was now brought in. The quantities used were the same in the case of each salt and were fixed at supplying respectively .003 per cent., .002

per cent., and '001 per cent. lithium. As before, the experiments were in duplicate, the salts mixed with the whole soil in a pot, and twelve seeds per pot sown November 21, 1911, subsequently reduced to six growing plants per pot. There were, accordingly, two pots with lithium phosphate containing '003 per cent. lithium, two with '002 per cent., and two with '001 per cent., and corresponding pots with lithium nitrate, and with lithium carbonate. The first observations, as regards the action of the respective salts on the incubation of the plant, were very interesting, and would seem to go far in the direction of showing that the influences which determine the ultimate yield are mainly those which are exercised at the time of germination rather than those that are active at a later stage in the plant's history.

It was noticed, first, that, as regards lithium phosphate, the higher amount ('003 per cent.), though it did not injure the germination, prolonged the period of incubation of the seed by quite three days; with lithium nitrate ('003 per cent.) there was an even greater retardation, but with lithium carbonate there was practically no change as compared with the control plants (untreated). With the lower amounts, however, of lithium—whether used as phosphate or as nitrate—there was no increase in the incubation period of the plant, and the shoots appeared quite as readily as with the control plants.

As the plants grew on, it was next observed that where the heavier applications ('003 per cent.) had been given the plants began to show a yellowishness of the leaf, and to fall away. On the other hand the smallest addition of lithium ('001 per cent.) seemed to give the most satisfactory looking crops, together with a darkening of the foliage, as if chlorophyll activity and starch assimilation had gone on more favourably.

The relative appearances are shown : (1) In Plate 3, where (a), (b), (c), (d), represent respectively no treatment and lithium phosphate in increasing quantities ; (2) In Plate 5, where the action of lithium nitrate is shown ; (3) Plate 7, where that of lithium carbonate is exemplified. The respective appearances presented are very fairly brought out in the weights obtained at harvest, the comparative results being as follows :—

| | | | | | Corn | Straw |
|-------------------|------|-----------|---------|---|------|-------|
| No treatment | . | . | . | . | 100 | 100 |
| Lithium phosphate | '003 | per cent. | lithium | | 80 | 67 |
| " | " | '002 | " | " | 117 | 100 |
| " | " | '001 | " | " | 116 | 110 |
| Lithium nitrate | '003 | " | " | | 14 | 61 |
| " | " | '002 | " | " | 143 | 141 |
| " | " | '001 | " | " | 192 | 166 |
| Lithium carbonate | '003 | " | " | | 77 | 78 |
| " | " | '002 | " | " | 113 | 101 |
| " | " | '001 | " | " | 108 | 109 |

These results have a most marked significance, and the more so because of the confirmation they have received in the earlier experiments. At the same time they cannot but be called very striking, for, to take a single instance, who would have for a moment imagined that the mere presence of $\cdot001$ per cent. of lithium in a soil would cause the produce of the untreated soil to be raised from 100 to 192, or again, that the increasing of the amount of lithium present by $\cdot001$ per cent. would cause a drop from 143 to 14 in the produce. It is clearly brought out that lithium, in whatever form, must not be present to the extent of $\cdot003$ per cent., or the influence will be a toxic one, this being more marked with the nitrate than the phosphate or the carbonate.

Again, it would seem that the stimulating effect is greater with lithium nitrate than with any other lithium salts, and, further, that, on the whole, the stimulation is greater the smaller be the amount of lithium used. The results with lithium phosphate and lithium carbonate show only small increases over the control (no treatment) lots; the case is, however, very different with lithium nitrate.

It is also worthy of note that the plants grown with lithium nitrate in small quantity showed the largest amount of tillering and better root growth, also that, to judge from the greener appearance of the foliage, chlorophyll activity and starch formation were going on more freely. Lastly, it was found that the grain produced was, as a rule, of more glutinous nature where lithium nitrate exercised its stimulating effect on the crop.

The following general conclusions may, as the outcome of these several years' investigations, be drawn as regards the influence of lithium salts.

1. That lithium, in the form of any of its salts, produces a toxic effect if it is present in the soil to the extent of $\cdot003$ per cent., or above that amount.

2. That the toxic effect is greater the more lithium there be present, and that as between different salts of lithium, the nitrate is the most toxic.

3. That when present in the soil to an amount not exceeding $\cdot002$ per cent., lithium possesses a stimulating influence and is no longer toxic in nature.

4. That, while this applies to all salts of lithium, the nitrate would seem to be the most stimulating salt, and to produce the best results when present not in excess of $\cdot001$ per cent. lithium.

5. That the action of lithium salts on vegetation is exerted mainly in the early stage of the germination of the seed.



a *b* *c* *d* *e*

PLATE 1.—Lithium Phosphate on Wheat. Season 1911.

(*a*) No treatment; (*b*) '0025 per cent.; (*c*) '005 per cent.; (*d*) '0075 per cent.; (*e*) '01 per cent. of Lithium respectively in soil.



a *b* *c* *d*

PLATE 2.—Zinc Phosphate on Wheat. Season 1911.

(*a*) '025 per cent.; (*b*) '05 per cent.; (*c*) '075 per cent.; (*d*) '10 per cent. of Zinc respectively in soil.



a *b* *c* *d* *e* *f* *g*

PLATE 3.—Lithium Phosphate and Zinc Phosphate on Wheat. Season 1912.
 (a) No treatment; (b) '003 per cent.; (c) '002 per cent.; (d) '001 per cent. of Lithium respectively in soil; (e) '03 per cent.; (f) '02 per cent.; (g) '01 per cent. of Zinc respectively in soil.



a *b* *c* *d* *e* *f* *g* *h*

PLATE 4.—Lithium Nitrate and Zinc Nitrate on Wheat. Season 1911.
 (a) '0025 per cent.; (b) '005 per cent.; (c) '0075 per cent.; (d) '01 per cent. of Lithium respectively in soil; (e) '025 per cent.; (f) '05 per cent.; (g) '075 per cent.; (h) '10 per cent. of Zinc respectively in soil.



a *b* *c* *d*
 PLATE 5.—Lithium Nitrate on Wheat. Season 1912.

(*a*) No treatment ; (*b*) .003 per cent. ; (*c*) .002 per cent. ; (*d*) .001 per cent. of Lithium respectively in soil.



a *b* *c* *d* *e* *f*
 PLATE 6.—Zinc Nitrate and Lead Nitrate on Wheat. Season 1912.

(*a*) .03 per cent. ; (*b*) .02 per cent. ; (*c*) .01 per cent. of Zinc respectively in soil ; (*d*) .03 per cent. ; (*e*) .02 per cent. ; (*f*) .01 per cent. of Lead respectively in soil.



a *b* *c* *d*

PLATE 7.—Lithium Carbonate on Wheat. Season 1912.

(*a*) No treatment ; (*b*) '003 per cent. ; (*c*) '002 per cent. ; (*d*) '001 per cent. of Lithium respectively in soil.



a *b* *c* *d* *e* *f*

PLATE 8.—Zinc Carbonate and Lead Carbonate on Wheat. Season 1912.

(*a*) '03 per cent. ; (*b*) '02 per cent. ; (*c*) '01 per cent. of Zinc respectively in soil ; (*d*) '03 per cent. ; (*e*) '02 per cent. ; (*f*) '01 per cent. of Lead respectively in soil.



a

b

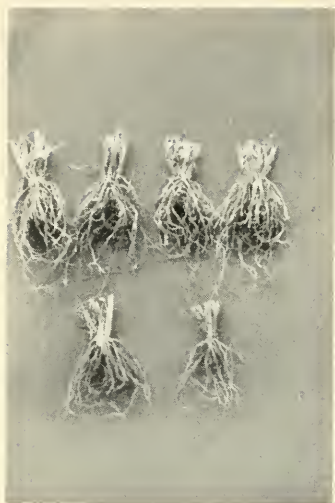
c

d

e

PLATE 9.—The influence of increasing the ratio of Magnesia to Lime in soil. Season 1907.

(*a*) Natural soil containing Lime 40 per cent., Magnesia 20 per cent.; (*b*) soil contains Lime 80 per cent., Magnesia 40 per cent.; (*c*) soil contains Lime 80 per cent., Magnesia 56 per cent.; (*d*) soil contains Lime 80 per cent., Magnesia 80 per cent.; (*e*) soil contains Lime 80 per cent., Magnesia 1 per cent.



a



b



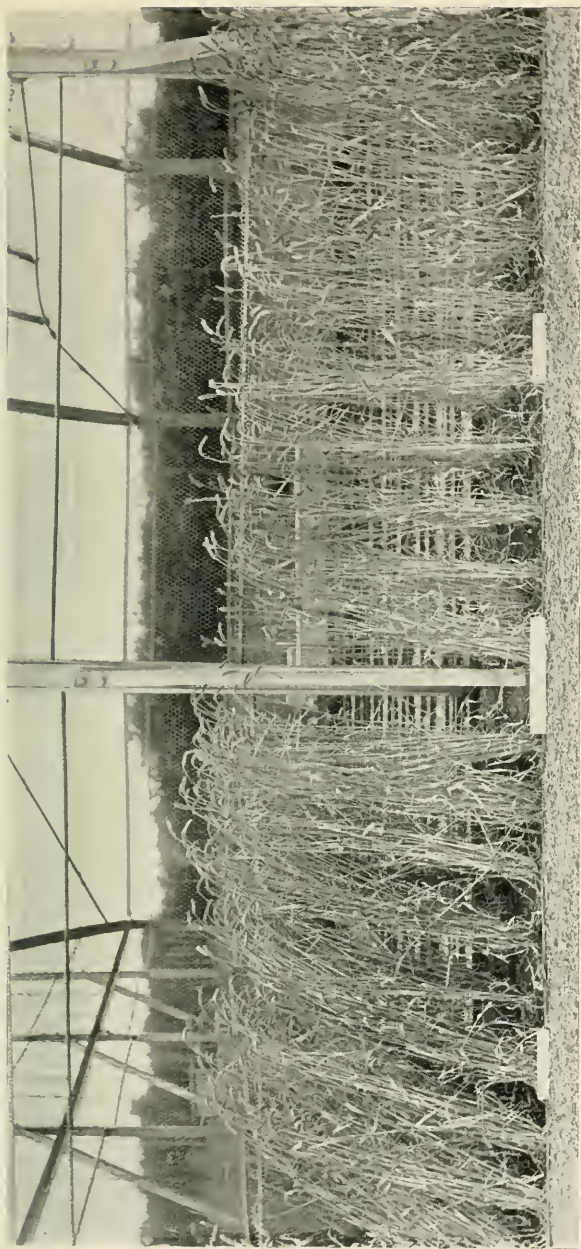
c



d

PLATE 10.—Roots from Wheat plants similar to those of *a*, *b*, *c*, and *d* of Plate 9.
Season 1906.

(*a*) Magnesia 20 per cent. ; (*b*) Magnesia 28 per cent. ; (*c*) Magnesia 35 per cent. ;
(*d*) Magnesia 50 per cent.



b

a

PLATE 11.—The value of Magnesia as an addition to the soil. Wheat, 1912.
(a) Natural soil containing Lime .77 per cent., Magnesia .20 per cent.; (b) the same soil, but to which Magnesia has been added until the
respective proportions are Lime .77 per cent., Magnesia .40 per cent.

(b) *The influence of Zinc Salts on Wheat.*

Already in 1909 experiments were begun with salts of zinc, the oxide, chloride, sulphate, and carbonate being tried, and each in quantity supplying .04 per cent. of the metal zinc in the soil used. Used at this rate it was found that the zinc salts were, one and all, detrimental to the crop, the injury being the more marked with the soluble salts (chloride and sulphate). This work is recorded in Journal R.A.S.E., Vol. 71, 1910, page 345.

1. *Zinc Salts, 1910.*

In 1910 the experiments with zinc were continued, the same salts (oxide, chloride, sulphate, and carbonate) being used, with the addition of the phosphate and nitrate. Also the amount of zinc supplied was in each case only .02 per cent. in place of the .04 per cent. used in 1909.

The general details of the arrangements were quite similar to those just recorded in the case of the lithium experiments, so that they need not be repeated.

There was practically no influence on the period of incubation of the seed, thus forming a contrast to the lithium salts which were then also being tried, and this, although the zinc salts were being used in much greater concentration than the lithium salts. Up to the end of April no clear differences could be seen between any of the crops, and none then showed any signs of toxic effect. On the whole, the oxide and carbonate plants looked about the best, and with the more soluble salts—chloride, sulphate and nitrate—the straw seemed to be affected as regards length. Some while later, the nitrate plants began to develop more growth and to show a broad dark-coloured flag; this was accompanied by a marked increase in the tillering, so that when, eventually, measurements, &c., of the crops were taken, though the zinc nitrate was found to have reduced the length of the straw, it yet gave more stalks and a greater length of ear than any other lot. There was nothing particular to remark at harvest-time between the applications as regards length of straw and ear, except in respect of the nitrate, which gave only 77 per cent. of the length of straw of the "control" set, though the length of ear was 106.9 as against 100. When the corn came to be threshed and weighed, the comparative results were:—

| | No. of Ears | Weight of Corn | Weight of Straw |
|-------------------------|----------------|-------------------|--------------------|
| No treatment | 100 | 100 | 100 |
| Zinc oxide | 112 | 98.4 | 116 |
| Zinc carbonate | 132 | 96.4 | 126 |
| Zinc chloride | 136 | 104 | 134 |
| Zinc sulphate | 152 | 113 | 134 |
| Zinc nitrate | 184 | 168 | 147 |
| Zinc phosphate | 96 | 71.2 | 109 |

A review of these figures shows that one may divide the lots roughly into two sets, first, the more soluble salts (chloride, sulphate and nitrate) which all show a certain stimulating action, this being far the most marked with the nitrate, secondly, the more insoluble salts, where the influence is neutral or nearly so. Setting aside the one case of the phosphate (which will be dealt with later), there would appear to be no instance of any toxic effect from the use of zinc salts when used so as to give not more than $\cdot 02$ per cent. of zinc in the soil. Further, that, when so used, the influence is a slightly stimulating one, more especially with the more soluble salts, and, in particular, the nitrate. The increased tillering from the use of nitrate has been already noted, and, though the straw was shortened, its total weight was, as set out in the table, increased. Moreover, it was noticed that the grain from this lot was essentially of glutinous nature.

2. *Zinc Phosphate and Zinc Nitrate, 1911.*

The above led to a repetition of the experiments in 1911 with special reference to the phosphate and nitrate of zinc. At the same time, as the results of the 1910 work were not then available, it was not possible to devise the new experiment in accordance with these, and the quantities used followed the lines of the corresponding experiment with lithium phosphate and lithium nitrate. So the quantities used were respectively $\cdot 025$ per cent. zinc, $\cdot 05$ per cent., $\cdot 075$ per cent., and $\cdot 10$ per cent. On this experiment it is unnecessary to dwell long, for it resulted in showing that practically all the applications exercised a toxic influence, the higher amounts, more especially with the nitrate, entirely destroying the germination of the seed and so preventing any crop resulting. The zinc phosphate applications did not seem to affect the germination of the seed, but the nitrate undoubtedly did. While the smallest dressing ($\cdot 025$ per cent. zinc) prolonged the period of incubation, and the next one ($\cdot 05$ per cent.) still more so, the higher quantities nearly or quite killed the seed. Plate 2 shows the action of the phosphate and Plate 4 that of the nitrate on the wheat crop of 1911. The untreated set to compare with these is (a) of Plate 1. On weighing the produce the lowest dressing ($\cdot 025$ per cent.) of zinc phosphate gave 70 per cent. of the corn of the untreated soil, but all the other dressings showed much heavier losses. Even the $\cdot 025$ per cent. application of zinc nitrate showed marked toxic action, although the previous year's experiment had shown that $\cdot 02$ per cent. exerted a stimulating action. It is hard to think that this could have been purely the result of season. It might be pointed out, however, when comparing the two seasons 1910 and 1911, that these were of very different

nature, the drought of 1911 no doubt making conditions more adverse. But still, on the whole, the general conclusions of former years were borne out, viz., that up to '02 per cent. zinc may be present in a soil and exert a stimulating influence, but that beyond this amount it is distinctly toxic.

3. *Zinc Phosphate, Zinc Nitrate, and Zinc Carbonate, 1912.*

It having been established that '02 per cent. of zinc in a soil was about as much as could be safely used, it was decided, in conjunction with the similar experiment with lithium salts, to see if quantities well below this would show any beneficial action. The salts determined upon were the phosphate, nitrate, and carbonate, and the respective dressings were '03 per cent., '02 per cent., and '01 per cent. of metallic zinc. As regards the appearing of the shoots the heavier dressings ('03 per cent. zinc) of both the phosphate and the nitrate retarded the germination of the seed, but eventually all the plants came up. Throughout the period of growth the heavier applications ('03 per cent.) in no case looked so well as did the others, but the smaller applications, as a rule, showed an improvement on the control lots. The nitrate sets in particular had a deep green colour and showed vigorous growth. It was in May, however, that all the zinc-treated crops, and, in particular, the nitrate ones, became attacked by a species of *torula*, which weakened the plant very greatly. This was followed by an attack of red rust, which spread so much as, in the case of the nitrate lots, to practically ruin the crop, for, when the excessive wet of August set in, the stalks were beaten down, reduced to a black, rotting mass, and what corn was ultimately obtainable was of little or no value for purposes of comparison. The phosphate and carbonate lots were also affected, but not nearly to the same extent. At harvest they showed results in corn and straw but little different from the untreated lots, so that no clear evidence could be drawn from them. The nitrate lots in all cases showed great deterioration. A very interesting question here arises—whether the attack on the wheat plant, first by the *torula* and then by rust, was in any way connected with any weakening of the plant through the action of the zinc salts. This is a matter for inquiry, but it is well to state here that the zinc-treated plants were alongside the lithium and the lead-treated ones, and the external conditions were precisely the same in all cases; yet it was only on the zinc-treated plants that the attack came, and this extended alike to the phosphate and carbonate as well as the nitrate lots, though the damage was by far the most marked in the case of the last named. Plate 3 shows in (*e*) (*f*) and (*g*) the treatment with zinc phosphate, (*a*) on the same plate supplying the control.

Plate 6 shows in (a) (b) and (c) the action of zinc nitrate (the control being (a) of Plate 5), and Plate 8 shows in (a) (b) and (c) the action of zinc carbonate, the control being given in (a) of Plate 7.

It is clear from this experiment of 1912 that a fresh factor—that of the existence of fungoid disease—comes in, and calls for investigation in the future. Whether there be any connection between the occurrence of this and the presence of the zinc salts requires to be ascertained. Meantime, however, one cannot go beyond the general conclusions so far found, viz., that zinc salts if containing above .02 per cent. of that metal will exercise a toxic influence, but below that figure will have a slightly stimulating effect, this being the most marked with the more soluble salts, and, in particular, the nitrate.

It is worthy of note that these figures found for zinc are no less than ten times as much as those found for lithium. In other words, lithium exercises quite ten times the toxic or the stimulating influence that zinc does.

(c) *The influence of Lead Salts on Wheat, 1912.*

In 1912, when experiments were being conducted with lithium and zinc, it was decided to try lead in similar forms of combination. Accordingly an experiment was arranged, in which lead phosphate, lead nitrate, and lead carbonate were respectively used, the amounts of lead (metal) contained being .03 per cent, .02 per cent. and .01 per cent. Used in these amounts lead was found to be a particularly inert material, so far as the phosphate and the carbonate were concerned, for these salts seemed to exercise no influence on the incubation of the seed, nor to possess either toxic or stimulating properties. The harvest results were practically the same as with the control (untreated) set. The lead nitrate, however, showed distinct stimulating influence, and at harvest the comparative results were :—

| | Corn | Straw |
|----------------------------------|------|-------|
| Untreated | 100 | 100 |
| Lead nitrate, .03 per cent. lead | 162 | 153 |
| " .02 " " | 153 | 134 |
| " .01 " " | 130 | 127 |

Plate 6 shows, in (*d*), (*e*) and (*f*) the action of lead nitrate, the "control" being given in (*a*) of Plate 5; and Plate 8 gives, in (*d*), (*e*) and (*f*) the action of lead carbonate, the "control" being (*a*) of Plate 7. It will be noticed that lead nitrate and lead carbonate did not exert the injurious influence that the corresponding zinc salts did. Nor was there any failure with the lead phosphate such as occurred with the heavier dressing (003) of lithium phosphate.

The general conclusion can be drawn that lead, when present to the extent of '03 per cent., does not possess any toxic influence upon vegetation, and that the nitrate, with that amount present, would seem to possess stimulative properties. Further experiments are needed to determine the amounts that can be safely or advantageously used.

General Conclusions.

The foregoing account cannot be read without the conclusion being come to that the experiments have established clearly that the presence in the soil of quite small quantities of what are termed the "rarer constituents" has a far greater influence on vegetation than has hitherto been supposed. We need only take the single case of lithium salts to show that Mr. Hills' suppositions have been more than justified, and that useful knowledge has been obtained through pursuing the enquiries which he proposed.

Further, it has been shown how very differently such metals as lithium, zinc and lead behave in respect of their action on vegetation, for, while lithium cannot be used to an extent above '002 per cent. in a soil without producing harm, zinc may be employed in ten times this amount with impunity, and lead probably to an even greater extent. Hence a large field has been opened up for further enquiry, and it is necessary that the enquiry be now extended to other crops than wheat, for it does not, by any means, follow that all crops respond similarly to stimulus. Considerable advance has, however, now been made in showing that certain metallic salts have either a toxic or a stimulating effect upon vegetation, the particular effect depending upon the quantity of the metal present.

Next, there come important considerations of another kind—at what stage of the plant's life are these influences exerted? The evidence so far adduced leads strongly to the belief that it is during the germination of the seed rather than at the later stages of the plant's growth, that these influences are exercised.

In conclusion, these experiments have without doubt shown that minute quantities of certain metallic compounds exercise upon the wheat plant an action which is capable of altering its entire character and bringing about changes in its development, root formation, and even in the nature of the grain produced.

II. *The Relation of Lime to Magnesia in Soils.*

(a) The addition of Magnesia.

Frequent references have been made in past accounts of the Woburn Pot-culture Station to work done in regard to lime and

magnesia in soils, and the bearing of one on the other. There has, however, been no detailed account published as yet in this Journal, though the work has been made familiar to visitors at the country Shows of the Society. It was at Lincoln in 1907 that the first exhibit on this subject was made, this comprising the produce of wheat grown in 1906, with illustrations of the growing crop and the roots of the several wheat plants.

As, however, these have not as yet been published, they are now set out in Plates 9 and 10. The soil used in these experiments was the ordinary Woburn soil containing lime 40 per cent., magnesia 20 per cent.

In 1906, while the amount of lime was kept at the same figure (40 per cent.), magnesia was gradually added so as to give respectively (*b*) 28 per cent.; (*c*) 35 per cent.; (*d*) 50 per cent.

The harvest results were :—

| | Weight of | | Percentage | | Percent- age of nitrogen in grain |
|--|-----------|---------|------------|-------|--|
| | Corn | Straw | Corn | Straw | |
| | Grammes | Grammes | | | |
| <i>a</i> Natural Soil (lime 40, magnesia 20) | 20·98 | 35·04 | 100 | 100 | 1·14 |
| <i>b</i> Magnesia added (lime 40, magnesia 28) | 24·57 | 40·62 | 117 | 116 | 1·29 |
| <i>c</i> Magnesia added (lime 40, magnesia 35) | 24·05 | 43·62 | 114 | 124 | 1·71 |
| <i>d</i> Magnesia added (lime 40, magnesia 50) | 12·51 | 32·11 | 59 | 91 | 3·13 |

These figures show that there was an increase of yield as magnesia was added, so long as the magnesia did not exceed the lime present, but that as soon as the ratio 1 : 1 (lime to magnesia) was exceeded, a falling off took place.

In Plate 10 are given the appearances of the roots of plants taken from the respective sets. The differences in these, as well as the increase of nitrogen in the grain, as more magnesia was added, will be referred to later.

In 1907 the experiment was repeated with some modification, for, while one "untreated" set was kept to, in the other cases the quantity of lime was doubled, with the object of seeing whether similar conclusions to those of 1906 could be drawn when lime was present in greater amount. Accordingly, while (*a*) remained the natural or "untreated" soil with lime in excess of magnesia (ratio 2 : 1), in the other sets lime was added to bring the amount of lime up to 80 per cent. Magnesia was then added so as to bring up the amounts of magnesia

respectively to 40 per cent. in (b), 56 per cent. in (c), 80 per cent. in (d), and 1.0 per cent. in (e).

The first observation made was that the presence of magnesia prolonged the incubation period of the seed. The plant, however, seemed to show a darker colour and stronger growth where magnesia was present. As the crop ripened, the straw from the magnesia treatment became distinctly shorter, though of stouter character. The ripening of the crop was, further, retarded by the presence of magnesia.

The general results as regards the wheat crop of 1907 are well shown in Plate 9, and the harvest results briefly set out were :—

| | No. of ears | No. of grains | Weight of | | Percentage | | Percentage of nitrogen in grain |
|---|-------------|---------------|-----------|---------|------------|-------|---------------------------------|
| | | | Corn | Straw | Corn | Straw | |
| | | | Grammes | Grammes | | | |
| a. Natural soil (lime 40, magnesia 20) | 16.66 | 625 | 28.39 | 59.05 | 100 | 100 | 1.20 |
| b. Magnesia added (lime 80, magnesia 40) | 24.00 | 819 | 39.61 | 61.20 | 139 | 122 | 1.88 |
| c. Magnesia added (lime 80, magnesia 56) | 21.66 | 696 | 32.18 | 60.00 | 113 | 120 | 2.19 |
| d. Magnesia added (lime 80, magnesia 80) | 12.66 | 155 | 6.01 | 15.73 | 21 | 31 | 2.47 |
| e. Magnesia added (lime 80, magnesia 1.0) | 2.0 | 24 | 0.65 | 1.49 | 2.3 | 2.9 | — |

These results differ somewhat from those of 1906, which showed a regular gain until the ratio of 1 : 1 was exceeded. This may possibly be due to the decision to increase, in 1907, the quantity of lime. But, putting together the several years' experiments on this subject, it was found generally that as the ratio of 1 : 1 was approached, there was some increase in the crop, but as soon as the magnesia came into excess, a lowering of the produce took place, and with increasing amounts of magnesia the influence became a toxic one.

But this was not the only result obtained, for, on taking out the roots after harvest they were found to have undergone very remarkable alterations, the type of root formed where magnesia was in excess of lime being quite different to the ordinary, and being specially marked by its fine and feathery nature and the abundance of root development. These appearances are well brought out in Plate 10, in which are shown the roots of the

1906 crop, and which are similar to those obtained in 1907 from the respective pots (a), (b), (c), and (d) of Plate 9.

Yet another feature was prominently brought forward, viz., that the grain altered its character according as more and more magnesia was present in the soil, and starting with the ordinary "Square Head's Master" wheat (a "starchy" wheat, as it would be termed), the grain obtained when magnesia had been added was found to have become what would be called a "hard" wheat, and the grains, on being cut across, exhibited a distinctly glutinous appearance, whereas the produce of the natural soil when cut across was quite "starchy." This change was even more emphasised in the succeeding lots where more magnesia had been used, though the grain itself was much more shrivelled. Analyses made subsequently showed that the grain grown with magnesia gave increasingly higher nitrogen contents as magnesia was added.

These observations were repeated with the same general results, and they were then extended to barley. Also different forms of magnesia were tried in 1908 (see *Journal R.A.S.E.*, Vol. 70, 1909, pp. 391-3). In 1909 ground limestone was tried in comparison with burnt lime, as also magnesian limestone. The addition of magnesia to the soil was tried with red clover and beans, but without showing any benefit. Lastly, in this year there was begun a new series of experiments which formed a complement to the earlier ones. Instead of a soil poor in magnesia, one naturally richer in magnesia than in lime was taken, and this was treated with increasing quantities of lime. The account of these experiments of 1909 is given in *Journal R.A.S.E.*, Vol. 71, 1910, pp. 346-9.

Up to this point all the work done had been on the small, or "pot-culture" scale, and it had not been possible to obtain sufficient grain to test the question of "strength" as understood by the miller and baker. The most that could be done was to determine the nitrogen contents of the grain.

Later on—as will be recorded—the experiment was carried out on a larger scale. The general conclusions to be drawn at this stage were:—

1. That the addition of magnesia to a soil poor in this constituent will, as regards a corn crop, be attended with benefit so long as the amount of magnesia does not exceed that of lime, but that if the magnesia be in excess of the lime there will be diminution of produce.

2. That the influence of magnesia shows itself in a prolonging of the period of incubation and in later ripening of the crop, in greater leaf development and greener foliage, and also in a shortening of the straw.

3. That great changes are produced in the nature of the root growth and the character of the grain, the former becoming very fibrous and largely developed, and the latter changing from "starchy" to "glutinous" as magnesia is added.

At this time (1909) great interest continued to be shown in the question of "strength" of wheat, and the work of Prof. Biffen had resulted in his being able to place on the market certain "types" of wheat which he had obtained by selection and "breeding," and which were believed—in accordance with the Mendelian principles on which the selection had gone—to have the desirable quality of "strength" impressed upon them as a "fixed" character."

Inasmuch as the assertion of this "permanence" of character was based entirely upon biological considerations and claimed to be quite independent of considerations of the plant's environment, it seemed to me desirable—after the remarkable results which I had observed in the use of magnesia—to see whether the soil or its different constituents might not play a part in the matter, or whether the question was purely a biological one.

Accordingly I determined to take some of the wheats of "fixed" type, produced by Prof. Biffen, and by growing them in soils containing magnesia in varied proportions to see how far the wheats retained their characteristics, or if these became in any way modified.

This work was begun in December, 1909, when, having obtained from Prof. Biffen wheat of "Little Joss" (cross between "Square Head's Master" and "Ghirka") and of "8 B" (cross between "Rough Chaff" and "Red Fife"), also some of a French wheat ("Dreadnought"), I started each kind growing in pots filled with the ordinary soil of the Woburn Farm. This soil contained lime .334 per cent., magnesia .184 per cent. Magnesia in the following respective quantities .05 per cent., .10 per cent., .20 per cent. was added to other pots. Thus the second addition of magnesia raised the ratio of lime to magnesia to nearly 1 : 1, and the third addition of magnesia threw magnesia into slight excess. The magnesia was intimately mixed with the whole of the soil in each pot; the pots were filled on December 2, 1909, and the wheat sown December 3.

Nothing particular was noticed during growth, but by the end of May, 1910, the darker foliage of the heavier dressed pots (with magnesia) was apparent. About the first week in July it was seen that the lesser applications of magnesia had produced the longer straw. The crops were ready to cut about August 15, and on weighing the produce the following results were obtained :—

| | No. of ears | No. of grains | Weight of | | Percent- age of nitrogen in grain |
|-----------------------------------|-------------------|------------------|---------------|---------------|--|
| | | | Corn | Straw | |
| " Little Joss "— | | | | | |
| No treatment | 14 | 344 | Grammes 15.57 | Grammes 30.72 | 1.27 |
| .05 per cent. Magnesia added . | 17 | 426 | 19.70 | 35.30 | 1.57 |
| .10 " " " " . | 19 | 543 | 27.15 | 40.82 | 1.41 |
| .20 " " " " . | 19 | 587 | 27.92 | 42.65 | 1.62 |
| " 8 B "— | | | | | |
| No treatment | 20 | 373 | 14.29 | 31.69 | 1.28 |
| .05 per cent. Magnesia added . | 24 | 485 | 17.85 | 37.00 | 1.57 |
| .10 " " " " . | 23 | 563 | 21.62 | 36.17 | 1.80 |
| .20 " " " " . | 25 | 641 | 23.45 | 37.52 | 1.85 |
| " Dreadnought "— | | | | | |
| No treatment | 15 | 290 | 15.37 | 34.87 | 1.32 |
| .05 per cent. Magnesia added . | 17 | 509 | 25.65 | 40.05 | 1.46 |
| .10 " " " " . | 18 | 612 | 28.55 | 42.40 | 1.65 |
| .20 " " " " . | 20 | 572 | 28.55 | 39.51 | 1.92 |

Examining these results it will be seen that they are extremely consistent, and tell one and the same story for all the three varieties. As the amount of magnesia is increased so is the produce, alike of corn and straw, increased, and there would seem to be a clear advantage from adding magnesia, so long as this does not exceed the lime in amount. The grain when examined was also found to be more glutinous as more magnesia was used, and the determinations of nitrogen in the grain, given in the table, show this to be the case. It is not maintained, it should be said, that this is the same as what the miller or the baker calls "strength." There was, as explained, not sufficient of the produce to make a baker's test, and the nitrogen figures as recorded must only be taken as an indication of the direction in which the results tend. An examination of the grain of the various lots clearly showed that this had undergone considerable modification, the corn from the soil with the higher magnesia in it being harder and more translucent than that from the natural soil. This was not confined to one variety, but was common to all three. One cannot, therefore, but come to the conclusion from these experiments that the presence of magnesia in the soil has had a marked influence in modifying the character of the grain.

In 1911 the question was further examined, the plan resolved on being to take the produce of 1910 affected, as it had already been, by the magnesia added to the soil, and to sow it again under similar influences for a second year. Only one variety, the "8 B" (of Prof. Biffen), was available but this was sown in December, 1910, in fresh soil of similar

character to that used in 1910, and made up with similar additions of magnesia.

The harvest results were :—

| | No. of ears | No. of grains | Weight of | | Percent- age of nitrogen in grain |
|----------------------------------|-------------|---------------|-----------|---------|--|
| | | | Corn | Straw | |
| " 8 B." | | | Grammes | Grammes | |
| No treatment | 11 | 373 | 13·34 | 21·32 | 1·50 |
| ·05 per cent. Magnesia added . . | 14 | 313 | 10·74 | 19·82 | 1·97 |
| ·10 " " " " | 12 | 248 | 6·32 | 15·25 | 2·76 |
| ·20 " " " " | 11 | 67 | 1·70 | 10·25 | 3·08 |

These results are most significant, showing as they do, unmistakably, that the grain once affected by the action of magnesia, if again subjected to it in a second year shows a marked decline of crop, the more marked the more be the magnesia present. In other words, the grain has become subject to the toxic influence of magnesia used in excess. It will be noted that the untreated produce is not widely different in the two years 1910 and 1911, so that the falling off in 1911 cannot be put down to season. It will be observed also how the nitrogen percentage rises in the grain with the increase of magnesia.

Having now shown how the wheat crop could be influenced by the magnesia treatment, it was determined to try in 1912 whether by planting again the seed obtained in 1911, in soil of normal character, its cropping power could be restored, or if once affected it would remain so. Accordingly the seed of " 8 B " as grown in 1911 was resown in November, 1911 in the same sort of soil as had been used in 1911 for the "no treatment" set. There was nothing particular noticed as regards the germination, and the general appearance of the plants was good throughout, they being strong and healthy and showing good tillering. The results obtained at harvest were :—

| | No. of ears | No. of grains | Weight of | | Percent- age of nitrogen in grain |
|---|-------------|---------------|-----------|-------|--|
| | | | Corn | Straw | |
| " 8 B "—Treatment in 1910 and 1911. | | | Grms. | Grms. | |
| 1912 { No treatment | 14 | 285 | 11·87 | 24·15 | 1·67 |
| All sown { ·05 per cent. magnesia added . . | 13 | 304 | 12·29 | 24·79 | 1·64 |
| in { ·10 " " " " | 15 | 326 | 13·09 | 26·88 | 1·56 |
| ordinary { ·20 " " " " | 14 | 342 | 13·93 | 24·59 | 1·48 |
| soil. | | | | | |

These figures again are very striking and show that the toxic effects produced by the repetition of magnesia treatment in 1911 are removed by growing the seed again in normal soil. Not only is this so, but the grain previously treated with magnesia would seem to have retained some of its early advantage, as the crop is somewhat above the "no treatment." Moreover it is noticeable that the grain that gave in 1911 the highest nitrogen when treated with magnesia, now gave the lowest nitrogen when planted in ordinary soil.

Whatever may be said in respect of the "fixing" of type by biological considerations, I cannot help feeling that the present work has shown that there is another side to the question also, and that when such changes as those described above have been seen in the case of the Cambridge wheats, alike as regards yield, character and composition of grain, as the result of increasing or decreasing the proportions of magnesia to lime in the soil, it cannot be urged that the nature or composition of the soil is without influence as a determining factor.

(b) *The addition of Lime.*

Having tried the addition of magnesia to a soil poor in this constituent, it was thought well to reverse the nature of the enquiry, and to see whether a soil in which the magnesia naturally dominated over the lime would be improved by the addition of lime. That this is not without practical importance is seen by references which I have made of recent years in my Annual Reports (Annual Report of Consulting Chemist, 1908, page 306; 1909, page 350) in this Journal, and in which I have dealt with certain soils which have shown inability to carry satisfactory corn crops. In the analyses of these I have found no evidence of actual deficiency of necessary plant food, the one unusual feature being the great predominance of magnesia over lime. The institution of the experiments just recorded led me to think whether possibly the excess of magnesia present had to do with the want of fertility, and I accordingly set the new experiment on foot. For this purpose I took a soil from the red clay loam land of Herefordshire, about which complaint was made that it would not grow corn well. This soil, on analysis, showed lime .83 per cent., magnesia 2.29 per cent. In one case the natural soil was used, in a second case lime was added to bring the percentage of lime up to 1.25, in a third to 1.50 per cent., a fourth to 1.75 per cent., a fifth to 2.0 per cent., and in a sixth to 2.25 per cent., or practically equal quantities of lime and magnesia.

1. *Experiment of 1909.*

The first year's experiments (1909) are given in Journal R.A.S.E., Vol. 71, 1910, pp. 347-8, but the results will be set out

again later for comparison with those of 1910 and 1911. Suffice it meantime to repeat that the results of the first year were not marked by any increase of corn from the addition of lime, though there was a slight increase in straw.

2. Experiment of 1910.

It was decided to continue the experiment in 1910, the soil being turned out of the pots and aerated, but no further lime being added. An artificial dressing of superphosphate, sulphate of potash and sulphate of ammonia was, however, given in order to make up for the corn crop already removed. Wheat ("Square Head's Master") was sown November 15, 1909. It was noticed that the period of incubation was increased with the heavier applications of lime, but eventually all the plants came up, though there were 17 days' difference between the coming up of the full number of the "untreated" plants and the full number of those that had the heaviest lime dressing. At first the "untreated" plants came on much the quickest, and they were soonest in ear, but then gradually the limed lots gained, and were, moreover, distinguished by a deeper colour and increased size of flag. They also had much increased water requirements, showing that more rapid growth and transpiration were going on. The water requirements for the six sets were relatively represented by the following figures:—100 (untreated), 142 (lime 1.25 per cent.), 134 (lime 1.50 per cent.), 168 (lime 1.75 per cent.), 187 (lime 2 per cent.), 212 (lime 2.25 per cent.).

It was found (in contrast to 1909) that the straw was longer where lime had been applied, also the length of the ears was increased. At harvesting, the produce both of corn and of straw was shown to have been increased very materially with the addition of lime. The grain from the limed lots was also more glutinous than that from the untreated.

3. Experiment of 1911.

In 1911 the experiment was repeated, no further additions of lime being made, but the artificial manuring being given again as in 1910. Wheat ("Square Head's Master") was sown on November 9, 1910. It is important to bear in mind that the soil now used was the very same that had been employed for the crops both of 1909 and 1910, only the one addition of lime (at starting) being made. As in 1910, the "untreated" plants appeared considerably before the lime-treated ones, and until the end of April they were well ahead of the others. The "limed" lots, however, showed the characteristic broad and green flag that had been noticed before, and by the end of May they had practically caught up the "untreated." The "untreated," as before, showed at first the greatest length of straw,

and ripened off first, but vigorous growth continued with the more heavily limed lots to a later period. The relative demands for water were much as in 1910, the requirements being more as more lime was present.

The following table gives the collected harvest results for the 3 years 1909, 1910 and 1911 :—

| | 1909 | | | 1910 | | | 1911 | | |
|---------------------------------|-------------|-------------|--|-------------|-------------|--|-------------|-------------|--|
| | Corn | Straw | Percent- age of nitrogen in grain | Corn | Straw | Percent- age of nitrogen in grain | Corn | Straw | Percent- age of nitrogen in grain |
| | | | | | | | | | |
| 1. No treatment | Grms. 32·63 | Grms. 40·78 | 1·64 | Grms. 24·40 | Grms. 27·02 | 1·40 | Grms. 23·62 | Grms. 34·00 | 1·44 |
| 2. Lime added to 1·25 per cent. | 34·20 | 42·60 | 2·31 | 33·07 | 41·67 | 1·49 | 38·20 | 56·15 | 1·47 |
| 3. " " 1·50 " | 32·77 | 45·67 | 2·81 | 35·11 | 47·86 | 1·55 | 30·39 | 43·87 | 1·53 |
| 4. " " 1·75 " | 29·03 | 46·52 | 2·89 | 48·15 | 58·34 | 1·83 | 32·45 | 45·45 | 1·62 |
| 5. " " 2·0 " | 25·20 | 48·40 | 3·06 | 44·65 | 152·22 | 1·91 | 51·50 | 75·35 | 1·81 |
| 6. " " 2·25 " | 23·24 | 47·00 | 3·00 | 51·20 | 59·10 | 2·12 | 37·42 | 48·97 | 1·69 |

¹ Crop injured by birds.

Considering these results, it will be noticed in the first place that in 1909—the first year—while there was an all-round increase in straw, that in grain was only marked in one case, there being a diminution generally where lime was added. This may have arisen from the alkalinity imparted to the soil by the addition of caustic lime, for, on taking the results of 1910, by which time the lime had become thoroughly carbonated and had had time to come into action, it will be seen that there was a steady increase throughout, both corn and straw going up as the amount of lime was increased. The same increase, though not of so regular a character as in 1910, was shown in 1911, the limed crops being, one and all, well above the untreated ones. The irregularity in set 5, in 1910, was caused by a bird managing to get inside the wire enclosure and picking off two of the ears of this set. For the marked decrease in set 6, in 1911, there was no clear explanation, though it has to be remembered that this had produced the heaviest crop in 1910. Taking the average of the three years we have the following as the relative produce :—

| | | | | Corn | |
|---|------------------------------|---|---|---------|---------|
| | | | | Straw | |
| | | | | Grammes | Grammes |
| 1 | No treatment | . | . | 26·88 | 33·93 |
| 2 | Lime added to 1·25 per cent. | . | . | 35·15 | 46·80 |
| 3 | " " 1·50 " | . | . | 32·75 | 45·80 |
| 4 | " " 1·75 " | . | . | 36·54 | 50·10 |
| 5 | " " 2·0 " | . | . | 40·35 | 53·24 |
| 6 | " " 2·25 " | . | . | 37·29 | 51·69 |

As regards the grain, it was noticed each year that as more lime was added the tendency was to produce a more glutinous wheat, for, while the grain of the untreated set was each year quite "starchy," the other sets were distinctly glutinous. This is further borne out by the nitrogen determinations as given in the table.

The remaining feature of note is with regard to the root development. Between the roots of the untreated sets and those to which lime had been added there was a distinct difference, the latter showing the same fine hairy and increased development that was exhibited when magnesia had been added, and this, it has now been clearly established, is associated with greater nitrogen contents of the grain and the formation of a more glutinous wheat.

The general conclusion to be drawn from this three years' experiment is directly confirmatory of that found in the previous series where magnesia was added, viz., that when magnesia is in excess of lime in a soil then there is likely to be an impairing of the soil's productiveness, and that as the ratio of lime to magnesia more nearly approaches that of 1 : 1, so benefit will accrue. The important practical outcome of the work is to show that soils in which magnesia is in excess of lime will be greatly remedied by the addition of lime, until the proportions of lime and magnesia be equal in amount.

4. *Experiment of 1912.*

The soil (Hereford) had, up to the close of the 1911 experiment, received additions of lime, bringing the percentage from 1.50 per cent. up to 2.25 per cent., at which latter point the lime present equalled the magnesia. Having seen earlier the effect of throwing the magnesia into excess of the lime, it was decided to ascertain, in 1912, whether throwing the lime into excess would produce equally disastrous results; whether, in effect—to give a practical turn to the enquiry—excess of lime in a soil was as harmful as excess of magnesia. To do this, the same soil was again used, turned out and well aerated, the artificial manure added, and then additional lime given so as to make the soil contain respectively 2.5 per cent. lime, 3 per cent., 3.5 per cent., 4 per cent., and 4.5 per cent. This final addition represented the ratio of lime to magnesia 2 : 1—the original soil, it will be remembered, containing lime .83 per cent., magnesia 2.29 per cent.

Wheat ("Square Head's Master") was sown in the pots on November 21, 1911. The appearance of the shoots was very irregular, for while with the "untreated" set 60 per cent. had appeared in 25 days after sowing, in some cases of the "lime treated" lots 80 per cent. had appeared by then. It was hard,

therefore, in view of earlier observations, to attribute the incubation period directly to the influence of lime, and it is quite possible that temperature was a more determining factor.

By May, 1912, it was noticeable that the "untreated" sets were the most forward, and this continued until June, when the first two sets with addition of lime were quickly making up to them, the other three sets, however, being behind. By July 13, the first two "limed" sets were well ahead of the "untreated," and the next two also better. As the plants matured, it was seen that the applications of lime had lengthened the straw and also shown a tendency to lengthen the ear. This is in direct contrast to what had been noticed as the result of adding magnesia, for this latter caused shortening of both straw and ear. At harvest the following results were obtained :—

| | | Corn | Straw |
|---|-------------------------------------|---------|---------|
| | | Grammes | Grammes |
| 1 | No treatment | 10·60 | 20·40 |
| 2 | Lime added to 2·5 per cent. | 12·80 | 23·80 |
| 3 | " " 3·0 " | 18·92 | 30·79 |
| 4 | " " 3·5 " | 16·77 | 25·82 |
| 5 | " " 4·0 " | 16·65 | 23·30 |
| 6 | " " 4·5 " | 10·60 | 15·20 |

These results are directly in confirmation of previous ones. Whether the full effects of the new additions of lime have had time yet to tell is open to question—as was the case with the first applications of lime in 1909. And this may, possibly, account for the somewhat anomalous results of set 6. At all events, it is brought out that lime added up to 4 per cent. (the magnesia remaining at 2·29 per cent.) has given an increase both of corn and straw over the "untreated" set. And, what is most important, it has been shown that the addition of lime after the ratio 1:1 has been exceeded is not attended with the same toxic results that followed the similar addition of magnesia, and it may be concluded, accordingly, that the proportion of lime in a soil may quite well exceed that of magnesia without any detrimental effects following, whereas if the magnesia exceeds the lime the cropping properties are likely to suffer.

5. *Plot Experiment. 1911 and 1912.*

After obtaining in 1910 the results set out, it was considered desirable to try the experiment with magnesia on a larger scale, for it might well be asked whether the striking results obtained in pot-culture might not be due to the particular conditions of

growth. Accordingly, it was decided to grow in 1911 wheat on a plot of land just *outside* the pot-culture enclosure, in one case using the natural soil and in the other adding magnesia to the soil. A strip of land 36 square feet in extent was taken; the soil was analysed and gave lime .77 per cent., magnesia .20 per cent. The soil was dug up to the depth of 5 in. in November, 1910, and spread out on a cement floor and thoroughly mixed. One half was passed through a $\frac{1}{2}$ in. sieve, and then replaced where it had come from. To the other half, after similar sieving, magnesia was, by careful mixing, added in such amount as to raise the percentage of magnesia in the soil to .40 per cent., and the soil was then replaced. Thus there were two plots, side by side, the one having lime .77 per cent. and magnesia .20 per cent., the other lime .77 per cent. and magnesia .40 per cent.

Wheat ("Square Head's Master") was sown on December 23, 1910. There was no difference between the two plots as to the time of the plant appearing, but soon it was noticed that the plot with magnesia was stronger and darker in colour. So things went on until quite near harvest time, the magnesia plot having markedly the finer crop. Then the whole experiment was ruined for the year, for in a single night the birds came and cleared the lot off!

Nothing daunted, we determined to repeat the trial, dug over the ground, and re-sowed wheat in November, 1911, no more magnesia being added. The same differences as in 1911 were again clearly visible; both plots were excellent, but the magnesia one was decidedly the better. This afforded an object of much interest to the many visitors to the farm during the summer of 1912, and who could not fail to be impressed by it. A photograph of the two plots was taken, and is reproduced in Plate II. This photograph, taken shortly before harvest, shows very clearly the superiority of (b), the plot to which magnesia had been added.

The precaution had been taken, this year, to wire in the crop, and so the harvest results were fortunately obtained without loss. They were:—

| | Corn | Straw | Percentage of nitrogen in grain |
|--------------------------|------|-----------------|---------------------------------------|
| | Lb. | Lb. | |
| No treatment | 2 | 4 $\frac{1}{2}$ | 1.77 |
| Magnesia added | 3 | 6 $\frac{3}{4}$ | 2.17 |

The grain was examined by our valuer. He reported both lots to be excellent, but the magnesia lot was the more regular, translucent, and had a beautiful "bloom" on it. He put its

value at 1s. 6d. per quarter more than the untreated. The analysis made of the grain showed that the magnesia treated lot was distinctly more nitrogenous than the "untreated."

In this experiment we thus obtained, on a more practical scale, and by growing wheat, not in pots, but on open ground, complete confirmation of the results obtained in pot-culture, and these showed clearly that the addition of magnesia to a soil poor in it, so long as the soil retains excess of lime, will increase the yield of wheat.

It is now intended to extend this work by carrying it out on a field scale.

General Conclusions.

The work done up to the present has led to the following general conclusions:—

(1) That magnesia may, with advantage to the wheat plant, be added to a soil poor in magnesia, so long as the amount of magnesia in the soil does not exceed that of lime.

(2) That, as the ratio of lime to magnesia approaches 1 : 1 a benefit will continue to accrue, but that if magnesia be in excess, a toxic influence will be exercised and the crop be diminished.

(3) That soils in which magnesia is in excess of lime will not give fully satisfactory results as regards corn-growing, but will be benefited by the addition of lime.

(4) That lime used in excess does not possess the toxic influence which magnesia, similarly used, has.

(5) That magnesia and lime alike are capable of modifying the growth of the wheat plant, altering the nature and extent of the root development and the character of the grain. These modifications are mainly shown in the stronger and greener appearance of the flag, the production of a much developed and very fibrous root growth, and the greater assimilation of nitrogen resulting in the obtaining of a more glutinous grain.

CALF-REARING EXPERIMENT, 1912.

An experiment was begun at the Woburn Farm in the spring of 1912 on the best way of rearing calves from birth. A general summary of this and the results till then obtained was published in the Proceedings of the Council for November 6, 1912, and found its way into most of the agricultural papers. This experiment is, however, not yet concluded, and the report on it will be issued at a later date.

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STATISTICS AFFECTING BRITISH AGRICULTURAL INTERESTS.

WE have once again to thank the Board of Agriculture and Fisheries for their kindness in supplying us with early copies of the Tables for the Journal in the actual form required. For further information we must refer our readers to the various Agricultural Statistics published by the Board.

ACREAGE OF CROPS.

The first Table, "**Acreage under Crops and Grass and Number of Live Stock**," gives the numbers for England, Wales, Scotland, Great Britain, and the United Kingdom, for the beginning of June in 1911 and 1912. There was last year a decrease in the area under Crops and Grass amounting to 98,634 acres ($\frac{1}{3}$ per cent.) in Great Britain, and to 63,933 acres (over $\frac{1}{4}$ per cent.) in England. In the last five years there has been a decrease under this heading of 247,453 acres (nearly $\cdot 8$ per cent.) in Great Britain, and of 170,962 acres (nearly $\cdot 7$ per cent.) in England.

Last year the total area of **Corn Crops** in **Great Britain** increased by 111,494 acres. In individual crops there were increases of 50,271 acres in Barley; 34,416 in Peas; 18,383 in Oats; 19,699 in Wheat; and 14,569 in Rye, while there was a decrease of 25,844 or 8·2 per cent. in Beans. In the rest of the United Kingdom there were slight increases in the areas under corn crops.

Considering **England** only, there was a total loss of acreage under Crops and Grass of 63,933 compared with the previous year. This was owing to a decrease of 85,844 in **Permanent Grass**, the **Arable Land** having increased by 21,911 acres. Wheat increased by 17,907 acres, Barley by 27,531, Oats by 24,433, Rye by 13,047 and Peas by 34,180, while Beans decreased by 24,117 acres.

Taking **Crops other than Corn** we find in **England** an increase of 34,443 acres or 8·5 per cent. in Potatoes, one of 34,334 acres or 7·8 per cent. in Mangold, one of 26,955 acres or 26·3 per cent. in Vetches or Tares, while there was a decrease of 50,667 acres or 4·7 per cent. in Turnips and Swedes, and one of 90,194 acres or 3·8 per cent. in "Clover, Sainfoin, and Grasses under Rotation."

Bare Fallow in England decreased by 49,800 acres or 15·6 per cent.

LIVE STOCK RETURNS.

Compared with the previous year the **Horses** used for **Agricultural** purposes in **England** decreased by 26,898 or 3·2 per cent., which is not so bad as the decrease of $4\frac{1}{2}$ per cent. in the previous year. The unbroken horses also decreased by 6,558 or over 2·3 per cent. The numbers of both these classes are lower than in any year since at least 1900. Last year the number of **Agricultural Horses** in **England** was 816,734, and in the **United Kingdom** 1,443,269, not including stallions or unbroken horses.

Once more **Cattle** decreased in **England**, the total decrease being 86,521 or over 1·6 per cent. The numbers were lower than in the previous three years. Cows and heifers in milk decreased by 19,297 or nearly 1·2 per cent., and Cows and Heifers in Calf by 26,996 or 5·6 per cent. The total of **Cattle** in **England** stood at 5,087,455, and in the **United Kingdom** at 11,914,635. This last figure shows an increase in the year of 48,524—about ·4 per cent.

Sheep also decreased once again in **England**, the decrease last year being 1,235,040 or 7·8 per cent., while Ewes kept for breeding decreased by nearly 5·2 per cent. The totals are lower, in the case of **Sheep** in general, than since 1898 at least, and in the case of Ewes kept for breeding, since 1905.

The total of **Pigs** decreased last year in **England** by just a shade under 6 per cent., and in the **United Kingdom** by just over 6 per cent., the decrease in **Ireland** being over 6·4 per cent. The number of Sows kept for breeding decreased in **England** by 12·7 per cent., and in the **United Kingdom** by 11·1 per cent. Taking the average of the preceding five years there was a decrease of 35,000 or 1·5 per cent. in **Pigs** generally, and of 4·2 per cent. in Sows kept for breeding.

PRODUCE RETURNS.

There was last year in **England** a drop of 11 per cent. from the heavy **Wheat** crop of 1911, and the produce stood at nearly 4 per cent. below the average of the preceding five years. The yield per acre fell by nearly 12 per cent. in **England** and by very nearly as much in **Scotland**.

Barley again decreased in **England** last year, the fall being of 1 per cent. In the rest of the **United Kingdom** there were increases in yield, that in **Scotland** being of 9·6, that in **Wales** 4·2, and that in **Ireland** over 2 per cent. In **England** last year the fall in produce per acre was 8·8 per cent. from the previous year, and 15·8 per cent. from the average of the preceding five years.

Oats also continued to decrease in **England**, the fall last year was of 7·6 per cent. in the yield, which was 17 per cent.

below the average of the preceding five years. There was last year a slight fall in Wales, but an increase of 2·3 per cent. in Scotland, and of 12·9 per cent. in Ireland.

The crop of **Beans** in England (which is 95 per cent. of that of the United Kingdom) increased last year by $\frac{3}{4}$ per cent., the yield per acre increasing by nearly 10 per cent. **Peas**, which are practically confined to this country, increased in total yield by nearly 6 per cent., although the yield per acre fell by nearly 11 per cent.

The produce of **Potatoes** fell throughout the United Kingdom, both in total and in yield per acre. The fall in produce was nearly 21 per cent. in England, nearly 14 per cent. in Wales, 4 per cent. in Scotland, and 31 per cent. in Ireland. The produce in England was 16 per cent. below the average of the preceding five years, and the yield per acre fell by over 27 per cent. from that of 1911.

In England **Turnips** and **Swedes** gave a produce 29 per cent. higher than that of the previous year, but 18 per cent. below the average of the preceding five years. In Wales there was a decrease from the previous year, but in Scotland a large increase (over 18 per cent.). Last year the percentage of increase of yield per acre in England was over 36.

The produce of **Mangold** increased last year in England by over 18 per cent., but was about $\frac{1}{2}$ per cent. below the average of the preceding five years.

Hops also gave a greater yield last year, the increase being of over 14 per cent. in the total, and 8 per cent. in the yield per acre. In Hereford alone the yield per acre diminished. The total produce was nearly 9,000 cwt.—about 2·4 per cent.—above the average of the preceding ten years.

Hay from **Clover**, **Sainfoin**, &c., was not quite so scarce as the year before, but produced nearly 22 per cent. less than the average of the preceding five years in England, and over 16 per cent. less in Great Britain. **Hay** from **Permanent Grass** improved throughout the United Kingdom, the percentage of increase over the previous year being nearly 42 in England, nearly 39 in Great Britain, and over 13 in Ireland. The yield per acre in England was 8·7, and in Great Britain 8·6 above the average of the preceding five years.

EXPORTS AND IMPORTS.

Last year the **Imports** of **Wheat** into the United Kingdom showed an advance in quantity of 11·7 per cent. over those of the previous year, and of 11·2 per cent. over the average of the preceding five years. From the United States of America the imports increased 54·4 per cent. in quantity, from the Argentine 27·3 per cent., and from the British East Indies 20·9 per cent.

[Continued on page 345].

TABLE I.—*Acreage under Crops and Grass; and Number of Live Stock, and Scotland, Great Britain, Ireland, and the United*

| | England | | Wales | | Scotland | |
|---|---------------------|----------------|--------------------|---------------|---------------------|----------------|
| | 1912 | 1911 | 1912 | 1911 | 1912 ⁶ | 1911 |
| Total Area (excluding water) | Acres 32,394,210 | | Acres 4,749,651 | | Acres 19,070,466 | |
| Total Acreage under Crops and Grass ¹ | 24,414,493 | 24,478,426 | 2,760,197 | 2,770,397 | 4,821,334 | 4,845,835 |
| Arable Land | 10,596,843 | 10,574,932 | 738,433 | 724,288 | 3,325,027 | 3,348,568 |
| Permanent Grass ¹ | 13,817,650 | 13,903,494 | 1,021,764 | 2,046,109 | 1,496,307 | 1,497,267 |
| Wheat | 1,821,952 | 1,804,045 | 41,412 | 38,487 | 62,373 | 63,506 |
| Barley or Bere | 1,365,044 | 1,337,513 | 91,484 | 86,800 | 191,673 | 173,617 |
| Oats | 1,865,569 | 1,841,136 | 206,910 | 206,037 | 956,575 | 963,498 |
| Rye | 53,009 | 39,962 | 1,124 | 366 | 6,810 | 6,046 |
| Beans | 275,729 | 299,846 | 1,272 | 1,608 | 8,988 | 10,379 |
| Peas | 200,362 | 166,182 | 773 | 712 | 1,184 | 1,009 |
| TOTAL CORN CROPS | 5,581,665 | 5,488,684 | 342,975 | 334,010 | 1,227,603 | 1,218,055 |
| Potatoes | 436,948 | 402,505 | 25,955 | 26,667 | 149,768 | 142,629 |
| Turnips and Swedes | 1,015,958 | 1,066,625 | 56,985 | 57,947 | 439,592 | 438,818 |
| Mangold | 473,250 | 438,916 | 12,414 | 11,154 | 2,822 | 2,250 |
| Cabbage | 60,545 | 58,092 | 877 | 785 | 5,369 | 6,302 |
| Kohl-Rabi | 20,241 | 13,192 | 111 | 86 | 48 | 52 |
| Rape | 74,294 | 68,229 | 5,081 | 4,515 | 6,972 | 5,829 |
| Vetches or Tares | 129,159 | 102,204 | 646 | 532 | 7,615 | 7,607 |
| Lucerne | 56,073 | 52,757 | 302 | 366 | 33 | 17 |
| Hops | 34,829 | 33,056 | — | — | — | — |
| Small Fruit | 76,887 | 76,287 | 1,110 | 902 | 7,144 | 7,119 |
| Clover, Sainfoin, and Grasses under Rotation | 2,237,071 | 2,327,265 | 285,942 | 281,512 | 1,468,016 | 1,511,031 |
| Other Crops | 130,724 | 128,121 | 1,509 | 1,048 | 3,024 | 3,020 |
| Bare Fallow | 269,199 | 318,999 | 4,526 | 4,764 | 7,021 | 5,639 |
| Horses used for Agricultural purposes ² | No. 816,734 | No. 843,632 | No. 89,489 | No. 93,117 | No. 147,917 | No. 150,305 |
| Stallions ³ | 6,765 | 6,323 | 1,689 | 1,495 | 1,202 | 1,057 |
| Unbroken } One year and above | 190,688 | 195,573 | 35,756 | 36,443 | 30,823 | 31,783 |
| Horses } Under one year . . | 85,380 | 87,053 | 21,502 | 20,367 | 13,078 | 13,427 |
| Total | 1,099,567 | 1,132,581 | 148,436 | 151,422 | 193,020 | 196,572 |
| Other Horses ⁴ | 145,684 | 125,741 | 12,323 | 11,175 | 12,247 | 9,902 |
| TOTAL OF HORSES | 1,245,251 | 1,258,322 | 160,759 | 162,597 | 205,267 | 206,474 |
| Cows and Heifers { In milk ⁵ | 1,610,742 | 1,630,039 | 238,194 | 237,355 | 361,851 | 361,721 |
| In calf but not in milk ⁵ | 451,465 | 478,461 | 47,518 | 47,025 | 74,619 | 70,448 |
| Other Cattle:—Two years and above | 1,017,004 | 1,038,708 | 95,191 | 89,607 | 232,375 | 265,730 |
| One year and under two | 1,053,021 | 1,037,107 | 186,496 | 174,470 | 279,063 | 274,382 |
| Under one year | 955,223 | 989,661 | 189,866 | 191,814 | 236,468 | 227,736 |
| TOTAL OF CATTLE | 5,087,455 | 5,173,976 | 754,265 | 740,271 | 1,184,376 | 1,200,017 |
| Ewes kept for Breeding . . . | 5,652,966 | 5,960,099 | 1,495,143 | 1,509,976 | 2,963,189 | 2,973,413 |
| Other Sheep:—One year and above | 2,881,980 | 3,359,815 | 762,731 | 795,578 | 1,270,167 | 1,345,481 |
| Under one year | 5,960,543 | 6,410,615 | 1,201,002 | 1,285,567 | 2,760,661 | 2,845,448 |
| TOTAL OF SHEEP | 14,504,489 | 15,739,529 | 3,548,876 | 3,591,121 | 6,994,017 | 7,164,342 |
| Sows kept for Breeding . . . | 291,184 | 333,786 | 42,897 | 41,797 | 19,668 | 22,206 |
| Other Pigs | 1,978,970 | 2,080,942 | 183,619 | 194,514 | 139,459 | 148,909 |
| TOTAL OF PIGS | 2,270,154 | 2,414,728 | 226,516 | 236,311 | 159,127 | 171,115 |

¹ Not including Mountain and Heath Land.² Including Mares kept for Breeding.³ Above two years old used, or intended to be used, for service.⁴ Not collected prior to 1911.⁵ Not separately distinguished before 1907.

as returned on June 4, 1912, and June 5, 1911, in England, Wales, Kingdom (including the Isle of Man and the Channel Islands).

| | Great Britain | | Ireland ⁷ | | United Kingdom. | |
|---|---------------------|---------------|----------------------|-------------|----------------------------------|---------------|
| | 1912 | 1911 | 1912 ¹⁰ | 1911 | 1912 ¹⁰ | 1911 |
| | Acres 56,214,327 | | Acres 20,247,197 | | Acres 76,461,977 ⁹ | |
| Total Area (excluding water) | | | | | | |
| Total Acreage under Crops and Grass ¹ | 31,936,024 | 32,094,658 | 14,674,895 | 14,707,808 | 46,794,864 | 46,926,500 |
| Arable Land | 14,660,303 | 14,647,788 | 4,988,759 | 4,943,809 | 9,747,084 | 19,686,722 |
| Permanent Grass ¹ | 17,335,721 | 17,446,870 | 9,686,136 | 9,763,999 | 27,047,780 | 27,239,778 |
| Wheat | 1,925,737 | 1,906,038 | 44,845 | 45,056 | 1,971,791 | 1,952,422 |
| Barley or Bere | 1,648,201 | 1,597,930 | 165,366 | 158,180 | 1,816,425 | 1,758,842 |
| Oats | 3,029,054 | 3,010,671 | 1,045,921 | 1,040,185 | 4,096,032 | 4,071,927 |
| Rye | 60,943 | 46,374 | 7,765 | 9,026 | 68,779 | 55,474 |
| Beans | 285,989 | 311,833 | 1,421 | 1,683 | 287,511 | 313,667 |
| Peas | 202,319 | 167,903 | 279 | 301 | 202,742 | 168,311 |
| TOTAL CORN CROPS | 7,152,243 | 7,040,749 | 1,265,597 | 1,254,431 | 8,443,280 | 8,320,643 |
| Potatoes | 612,671 | 571,801 | 595,218 | 591,259 | 1,219,617 | 1,175,158 |
| Turnips and Swedes | 1,512,535 | 1,563,390 | 271,761 | 270,805 | 1,792,513 | 1,842,226 |
| Mangold | 488,486 | 452,320 | 81,690 | 77,857 | 571,441 | 530,927 |
| Cabbage, Kohl-Rabi and Rape | 173,538 | 157,082 | 41,089 | 40,222 | 215,375 | 198,077 |
| Vetches or Tares | 137,420 | 110,543 | 2,008 | 2,317 | 139,748 | 113,194 |
| Hops | 34,829 | 33,056 | — | — | 34,829 | 33,057 |
| Small Fruit | 85,141 | 84,308 | 8 15,327 | 8 14,045 | 8 100,856 | 8 98,745 |
| Clover, Sainfoin, and Grasses under Rotation | 3,991,029 | 4,119,808 | 2,630,790 | 2,594,988 | 6,668,996 | 6,759,582 |
| Other Crops | 191,665 | 185,329 | 85,279 | 97,885 | 279,198 | 285,299 |
| Bare Fallow | 280,746 | 329,402 | — | — | 281,231 | 329,814 |
| Horses used for Agricultural purposes ² | No. 1,054,140 | No. 1,087,054 | No. 382,163 | No. 381,966 | No. 1,443,269 | No. 1,476,287 |
| Unbroken { One year and above | 266,923 | 272,674 | 101,502 | 100,536 | 369,938 | 374,761 |
| Horses { Under one year | 119,960 | 120,847 | 66,667 | 60,604 | 181,400 | 182,168 |
| TOTAL | 1,441,023 | 1,480,575 | 544,332 | 543,136 | 1,994,607 | 2,033,216 |
| Cows and Heifers in milk or in calf ³ | 2,784,389 | 2,825,049 | 1,598,986 | 1,565,418 | 4,400,816 | 4,407,800 |
| Other Cattle:— | | | | | | |
| Two years and above | 1,344,570 | 1,394,045 | 1,027,373 | 1,015,127 | 2,376,328 | 2,413,501 |
| One year and under two | 1,518,580 | 1,485,959 | 1,071,485 | 1,020,280 | 2,599,017 | 2,515,449 |
| Under one year | 1,378,557 | 1,409,211 | 1,150,654 | 1,110,895 | 2,538,474 | 2,529,361 |
| TOTAL OF CATTLE | 7,026,096 | 7,114,264 | 4,848,498 | 4,711,720 | 11,914,635 | 11,866,111 |
| Ewes kept for Breeding | 10,111,298 | 10,443,488 | 1,515,024 | 1,523,107 | 11,661,755 | 11,999,644 |
| Other Sheep:— | | | | | | |
| One year and above | 4,914,878 | 5,500,874 | 759,158 | 794,466 | 5,679,646 | 6,301,041 |
| Under one year | 10,021,206 | 10,550,630 | 1,554,647 | 1,589,863 | 11,615,744 | 12,179,122 |
| TOTAL OF SHEEP | 25,047,382 | 26,494,992 | 3,828,829 | 3,907,436 | 28,957,145 | 30,479,807 |
| Sows kept for Breeding | 353,749 | 397,789 | 130,842 | 149,315 | 486,296 | 549,079 |
| Other Pigs | 2,302,048 | 2,424,365 | 1,193,115 | 1,265,804 | 3,506,253 | 3,700,934 |
| TOTAL OF PIGS | 2,655,797 | 2,822,154 | 1,323,957 | 1,415,119 | 3,992,549 | 4,250,013 |

⁶ Furnished by the Board of Agriculture for Scotland.

⁷ Furnished by the Department of Agriculture and Technical Instruction for Ireland.

⁸ Figures for Ireland include Orchards.

⁹ Figures for Jersey include Water.

¹⁰ Subject to revision.

TABLE II.—Total Produce, Acreage, and Yield per Acre of
1912 and 1911, with the Average

| Crops | Total Produce | | Acreage | | Yield per Acre | | Average of the Ten Years |
|--------------------------|---------------|------------|-----------|-----------|----------------|-------|--------------------------|
| | 1912 | 1911 | 1912 | 1911 | 1912 | 1911 | 1902-1911 |
| WHEAT. | | | | | | | |
| | Qrs. | Qrs. | Acres | Acres | Bush. | Bush. | Bush. |
| England | 6,544,234 | 7,359,142 | 1,821,931 | 1,804,045 | 2874 | 3263 | 3183 |
| Wales | 136,113 | 135,430 | 41,383 | 38,487 | 26'31 | 28'15 | 27'17 |
| Scotland | 299,756 | 337,599 | 62,369 | 63,506 | 38'43 | 42'53 | 39'64 |
| GREAT BRITAIN | 6,979,923 | 7,832,171 | 1,925,683 | 1,906,038 | 29'00 | 32'87 | 31'94 |
| Ireland | 195,493 | 207,011 | 44,855 | 45,056 | 34'87 | 36'76 | 36'05 |
| UNITED KINGDOM | 7,175,416 | 8,039,182 | 1,970,538 | 1,951,094 | 29'13 | 32'96 | 32'16 |
| BARLEY (b). | | | | | | | |
| England | 5,198,356 | 5,256,546 | 1,365,038 | 1,337,431 | 30'47 | 31'44 | 33'43 |
| Wales | 344,049 | 330,678 | 91,484 | 86,800 | 30'09 | 30'48 | 31'24 |
| Scotland | 862,299 | 786,351 | 191,632 | 173,617 | 36'00 | 36'23 | 35'45 |
| GREAT BRITAIN | 6,404,704 | 6,373,575 | 1,648,154 | 1,597,848 | 31'09 | 31'91 | 33'56 |
| Ireland | 871,059 | 851,827 | 165,367 | 158,180 | 42'14 | 43'08 | 41'60 |
| UNITED KINGDOM | 7,275,763 | 7,225,402 | 1,813,521 | 1,756,028 | 32'10 | 32'92 | 34'24 |
| OATS. | | | | | | | |
| England | 8,292,549 | 8,981,803 | 1,865,569 | 1,841,136 | 35'56 | 39'03 | 42'27 |
| Wales | 853,141 | 858,792 | 206,910 | 206,037 | 32'99 | 33'35 | 35'27 |
| Scotland | 4,556,866 | 4,453,512 | 956,561 | 963,498 | 38'11 | 36'98 | 37'31 |
| GREAT BRITAIN | 13,702,556 | 14,294,107 | 3,029,040 | 3,010,671 | 36'19 | 37'98 | 40'26 |
| Ireland | 6,858,196 | 6,072,560 | 1,046,000 | 1,040,185 | 52'45 | 46'70 | 47'97 |
| UNITED KINGDOM | 20,560,752 | 20,366,667 | 4,075,040 | 4,050,856 | 40'36 | 40'22 | 42'25 |
| BEANS. | | | | | | | |
| England | 925,062 | 917,591 | 269,988 | 294,059 | 27'41 | 24'96 | 30'18 |
| Wales | 3,479 | 3,456 | 1,121 | 1,134 | 24'83 | 24'38 | 27'12 |
| Scotland | 37,039 | 39,089 | 8,421 | 9,463 | 35'19 | 33'05 | 35'61 |
| GREAT BRITAIN | 965,580 | 960,136 | 279,530 | 304,656 | 27'63 | 25'21 | 30'36 |
| Ireland | 7,426 | 7,556 | 1,421 | 1,683 | 41'81 | 35'92 | 42'30 |
| UNITED KINGDOM | 973,006 | 967,692 | 280,951 | 306,339 | 27'71 | 25'27 | 30'45 |
| PEAS. | | | | | | | |
| England | 485,608 | 458,976 | 172,441 | 139,150 | 22'53 | 26'39 | 27'31 |
| Wales | 1,772 | 1,641 | 623 | 561 | 22'75 | 23'40 | 22'18 |
| Scotland | 2,263 | 1,532 | 613 | 472 | 28'75 | 25'97 | 27'54 |
| GREAT BRITAIN | 489,583 | 462,149 | 173,677 | 140,183 | 22'55 | 26'37 | 27'28 |
| Ireland | 977 | 1,048 | 279 | 301 | 28'01 | 27'85 | 28'04 |
| UNITED KINGDOM | 490,560 | 463,197 | 173,956 | 140,484 | 22'56 | 26'38 | 27'25 |

(a) The particulars for Ireland have been furnished by the Department of Agriculture and Technical Instruction for Ireland, and those for Scotland, in 1912, by the Board of Agriculture for Scotland. No Produce Statistics are collected for the Channel Islands and the Isle of Man

each of the Principal Crops in the United Kingdom (a) in
of the Ten Years 1902-1911.

| Crops—continued | Total Produce | | Acreage | | Yield per Acre | | Average of the Ten Years |
|---|---------------|------------|-----------|-----------|----------------|-------|--------------------------|
| | 1912 | 1911 | 1912 | 1911 | 1912 | 1911 | 1902-1911 |
| POTATOES. | Tons | Tons | Acres | Acres | Tons | Tons | Tons |
| England | 2,115,033 | 2,674,756 | 436,948 | 402,505 | 4'84 | 6'65 | 6'09 |
| Wales | 126,006 | 175,374 | 25,955 | 26,667 | 4'85 | 6'58 | 5'15 |
| Scotland | 936,375 | 975,182 | 149,767 | 142,629 | 6'25 | 6'84 | 6'41 |
| GREAT BRITAIN | 3,177,414 | 3,825,312 | 612,670 | 571,801 | 5'19 | 6'69 | 6'12 |
| Ireland | 2,546,710 | 3,694,856 | 595,184 | 591,259 | 4'28 | 6'25 | 4'80 |
| UNITED KINGDOM. | 5,724,124 | 7,520,168 | 1,207,854 | 1,163,060 | 4'74 | 6'47 | 5'44 |
| TURNIPS AND SWEDES. | | | | | | | |
| England | 12,075,734 | 9,316,505 | 1,015,958 | 1,066,625 | 11'89 | 8'73 | 13'31 |
| Wales | 802,791 | 828,874 | 56,985 | 57,947 | 14'09 | 14'30 | 15'50 |
| Scotland | 7,390,633 | 6,251,569 | 439,587 | 438,818 | 16'81 | 14'25 | 16'27 |
| GREAT BRITAIN | 20,269,158 | 16,396,948 | 1,512,530 | 1,563,390 | 13'40 | 10'49 | 14'23 |
| Ireland | | 5,273,183 | | 270,805 | | 19'47 | 17'00 |
| UNITED KINGDOM. | | 21,670,131 | | 1,834,195 | | 11'81 | 14'64 |
| MANGOLD. | | | | | | | |
| England | 8,572,407 | 7,245,902 | 473,250 | 438,916 | 18'11 | 16'51 | 19'81 |
| Wales | 214,938 | 191,322 | 12,414 | 11,154 | 17'31 | 17'15 | 17'88 |
| Scotland | 49,540 | 43,209 | 2,830 | 2,250 | 17'51 | 19'20 | 17'81 |
| GREAT BRITAIN | 8,836,885 | 7,480,433 | 488,494 | 452,320 | 18'09 | 16'54 | 19'75 |
| Ireland | | 1,734,548 | | 77,857 | | 22'28 | 18'85 |
| UNITED KINGDOM. | | 9,214,981 | | 530,177 | | 17'38 | 19'63 |
| HAY from CLOVER, SAINFOIN, &c. | | | | | Cwt. | Cwt. | Cwt. |
| England | 1,804,895 | 1,774,464 | 1,378,985 | 1,465,383 | 26'18 | 24'22 | 30'12 |
| Wales | 226,157 | 185,658 | 175,924 | 172,049 | 25'71 | 21'58 | 25'20 |
| Scotland | 643,200 | 652,410 | 423,588 | 437,333 | 30'37 | 29'84 | 32'04 |
| GREAT BRITAIN | 2,674,252 | 2,612,532 | 1,978,497 | 2,074,765 | 27'03 | 25'18 | 30'09 |
| Ireland | 1,710,027 | 1,573,746 | 916,976 | 939,223 | 37'30 | 33'51 | 40'63 |
| UNITED KINGDOM. | 4,384,279 | 4,186,278 | 2,895,473 | 3,013,988 | 30'28 | 27'78 | 32'83 |
| HAY from PERMANENT GRASS. | | | | | | | |
| England | 5,530,564 | 3,898,205 | 4,394,906 | 4,283,629 | 25'17 | 18'20 | 24'32 |
| Wales | 503,868 | 444,891 | 546,628 | 547,194 | 20'63 | 16'26 | 19'86 |
| Scotland | 248,977 | 226,276 | 166,732 | 171,434 | 29'87 | 26'40 | 29'11 |
| GREAT BRITAIN | 6,343,409 | 4,569,372 | 5,108,266 | 5,002,257 | 24'84 | 18'27 | 24'00 |
| Ireland | 3,295,564 | 2,900,821 | 1,570,373 | 1,573,180 | 41'97 | 36'88 | 46'02 |
| UNITED KINGDOM. | 9,638,973 | 7,470,193 | 6,678,639 | 6,575,437 | 28'87 | 22'72 | 29'33 |
| HOPS. | Cwt. | Cwt. | | | | | |
| England (c) | 373,438 | 328,023 | 34,829 | 33,056 | 10'72 | 9'92 | 8'68 |

(b) Including Bere.

(c) No Hops are grown in any other part of the United Kingdom.

TABLE III.—*Estimated Total Production of Hops in the Years 1912 and 1911, with the Acreage and Estimated Average Yield per Statute Acre, in each County of England in which Hops were grown.*

| COUNTIES. | | Estimated total produce | | Acreage returned on 4th June | | Estimated average yield per acre | |
|-------------------------------|-------------|-------------------------|---------|------------------------------|--------|----------------------------------|-------|
| | | 1912 | 1911 | 1912 | 1911 | 1912 | 1911 |
| | | Cwt. | Cwt. | Acres | Acres | Cwt. | Cwt. |
| Kent | East . . . | 74,415 | 61,606 | 5,993 | 5,718 | 12·42 | 10·77 |
| | Mid. . . . | 85,718 | 79,101 | 7,330 | 6,966 | 11·69 | 11·36 |
| | Weald . . . | 100,277 | 86,032 | 8,077 | 7,507 | 12·42 | 11·46 |
| | Total, Kent | 260,410 | 226,739 | 21,400 | 20,191 | 12·17 | 11·23 |
| Hants . . . | | 18,473 | 14,627 | 1,516 | 1,444 | 12·19 | 10·13 |
| Hereford . . . | | 29,450 | 29,256 | 5,236 | 5,034 | 5·62 | 5·81 |
| Surrey | | 5,264 | 4,269 | 513 | 500 | 10·26 | 8·54 |
| Sussex | | 34,098 | 29,847 | 2,845 | 2,698 | 11·99 | 11·06 |
| Worcester . . . | | 24,880 | 22,630 | 3,186 | 3,061 | 7·81 | 7·39 |
| Other Counties ¹ . | | 863 | 655 | 133 | 128 | 6·49 | 5·12 |
| Total | | 373,438 | 328,023 | 34,829 | 33,056 | 10·72 | 9·92 |

¹ Gloucester and Salop.

NOTE.—The estimated average yield per acre, nearly 10½ cwt., is four-fifths of a cwt. above that of 1911, and 2 cwt. above the ten years' mean. The acreage being also 1,773 acres above that of 1911, the total production is thus 45,000 cwt. more, and it is also nearly 9,000 cwt. more than the average of the last ten years.

TABLE IV.—*Quantities and Values of Corn Imported into the United Kingdom in the undernoted Years.*

[From the December Accounts relating to Trade and Navigation of the United Kingdom.]

| Description | Quantities | | | Values | | |
|---|-------------|------------|-------------|------------|------------|------------|
| | 1910 | 1911 | 1912 | 1910 | 1911 | 1912 |
| | Cwt. | Cwt. | Cwt. | £ | £ | £ |
| Wheat | 105,222,638 | 98,067,787 | 109,582,539 | 44,160,884 | 38,909,816 | 46,449,605 |
| Wheat meal and flour | 9,960,491 | 10,065,132 | 10,189,476 | 5,510,905 | 5,277,043 | 5,518,484 |
| Barley | 18,281,500 | 24,545,420 | 20,126,294 | 5,396,452 | 8,266,115 | 7,877,961 |
| Oats | 17,495,014 | 18,273,037 | 18,300,700 | 4,823,869 | 5,390,970 | 6,338,565 |
| Peas | 1,591,111 | 2,196,094 | 2,574,707 | 718,740 | 1,012,862 | 1,291,602 |
| Beans | 849,082 | 1,029,101 | 1,256,741 | 311,676 | 375,333 | 470,847 |
| Maize | 37,021,192 | 38,602,330 | 43,877,338 | 10,294,340 | 10,713,183 | 13,593,216 |
| Oatmeal, groats, and rolled oats . . } | 775,033 | 835,985 | 832,218 | 582,225 | 598,405 | 602,604 |
| Maize meal . . . | 461,624 | 643,810 | 610,310 | 158,953 | 224,415 | 240,827 |
| Other kinds of corn and meal . . } | 1,740,362 | 1,829,263 | 1,684,394 | 645,415 | 748,723 | 802,089 |

TABLE V.—Average Prices of British Corn per Imperial Quarter in England and Wales, as ascertained under the Corn Returns Act, 1882, in each Week of the Year 1912.

| Week ended | Wheat | Barley | Oats | Week ended | Wheat | Barley | Oats |
|--------------------|-------|--------|-------|------------------------|-------|--------|-------|
| | s. d. | s. d. | s. d. | | s. d. | s. d. | s. d. |
| January 6 . . . | 33 2 | 33 3 | 20 7 | July 6 | 33 2 | 31 7 | 23 11 |
| January 13 . . . | 33 1 | 33 0 | 20 8 | July 13 | 38 3 | 30 2 | 24 1 |
| January 20 . . . | 33 4 | 33 3 | 20 11 | July 20 | 38 10 | 30 9 | 24 8 |
| January 27 . . . | 33 7 | 33 1 | 21 1 | July 27 | 38 9 | 30 9 | 23 4 |
| February 3 . . . | 33 8 | 32 10 | 21 3 | August 3 | 38 4 | 28 6 | 22 2 |
| February 10 . . . | 34 0 | 33 2 | 21 4 | August 10 | 39 2 | 30 7 | 22 4 |
| February 17 . . . | 34 4 | 32 10 | 21 7 | August 17 | 38 2 | 28 3 | 21 8 |
| February 24 . . . | 34 6 | 32 8 | 21 9 | August 24 | 35 6 | 28 1 | 20 10 |
| March 2 | 34 1 | 32 0 | 21 6 | August 31 | 34 10 | 28 6 | 20 8 |
| March 9 | 34 1 | 31 7 | 21 8 | September 7 | 35 1 | 29 9 | 21 8 |
| March 16 | 34 0 | 31 2 | 21 8 | September 14 | 33 5 | 29 0 | 20 5 |
| March 23 | 34 1 | 31 10 | 21 9 | September 21 | 32 7 | 29 6 | 19 10 |
| March 30 | 34 4 | 30 3 | 21 8 | September 28 | 31 7 | 29 9 | 19 5 |
| April 6 | 34 10 | 30 9 | 21 11 | October 5 | 31 8 | 29 7 | 19 8 |
| April 13 | 35 4 | 30 2 | 22 1 | October 12 | 31 10 | 30 4 | 19 5 |
| April 20 | 36 7 | 29 11 | 22 4 | October 19 | 32 2 | 30 11 | 19 9 |
| April 27 | 37 10 | 30 4 | 22 9 | October 26 | 33 1 | 31 6 | 19 10 |
| May 4 | 38 1 | 30 2 | 23 1 | November 2 | 33 4 | 31 10 | 20 1 |
| May 11 | 37 11 | 31 1 | 23 7 | November 9 | 33 1 | 31 11 | 19 11 |
| May 18 | 37 8 | 31 2 | 23 7 | November 16 | 32 10 | 31 2 | 19 9 |
| May 25 | 37 2 | 31 1 | 23 7 | November 23 | 32 1 | 30 11 | 19 11 |
| June 1 | 36 10 | 30 0 | 23 9 | November 30 | 31 9 | 30 8 | 19 8 |
| June 8 | 36 11 | 29 11 | 24 0 | December 7 | 31 0 | 29 11 | 19 6 |
| June 15 | 37 0 | 30 8 | 23 10 | December 14 | 30 8 | 29 2 | 19 3 |
| June 22 | 37 5 | 30 8 | 24 0 | December 21 | 30 7 | 28 11 | 19 1 |
| June 29 | 37 10 | 30 2 | 23 11 | December 28 | 29 10 | 28 6 | 19 2 |
| | | | | Average of year. | 34 9 | 30 8 | 21 6 |

TABLE VI.—Annual Average Prices per Quarter and Total Quantities of British Corn sold in the Towns in England and Wales making Returns under the Corn Returns Act, 1882, in the Year 1912.

| Year | Wheat | Barley | Oats | Wheat | Barley | Oats |
|------|-------|--------|-------|-----------|-----------|---------|
| | s. d. | s. d. | s. d. | Qrs. | Qrs. | Qrs. |
| 1912 | 34 9 | 30 8 | 21 6 | 2,365,596 | 2,165,572 | 630,755 |

TABLE VII.—Annual and Septennial Average Prices per Bushel of British Corn in the Year 1912, with the Value of 100l. of Tithe Rent-charge.

| Year | Annual average price | | | Septennial average price | | | Value of tithe rent-charge of 100l. | | |
|------|----------------------|--------|-------|--------------------------|--------|-------|-------------------------------------|----------------------------------|--|
| | Wheat | Barley | Oats | Wheat | Barley | Oats | Calculated on annual average | Calculated on septennial average | |
| | s. d. | s. d. | s. d. | s. d. | s. d. | s. d. | £ s. d. | £ s. d. | |
| 1912 | 4 4 | 3 10 | 2 8½ | 4 0½ | 3 3 | 2 4 | 85 8 7 | 74 14 9½ | |

[Continued from page 341]

over the year 1911. There was a decrease of 64·2 per cent. in the case of Roumania and of 14·4 per cent. in the case of Australia. Considering the money value, we spent on Wheat last year 7,539,789*l.* more than the year before—a rise of 19·3 per cent.

The quantity of **Barley** imported was over 18 per cent. above that returned in 1911, while the increase in value was nearly 4·7 per cent.

In **Oats** there was but a slight increase in quantity, but one of 17·6 per cent. in value.

With **Peas**, on the other hand, there was an increase of 17·2 per cent. in quantity and of 27·5 per cent. in value. **Beans** also showed a great rise—22·1 per cent. in quantity and 25·6 per cent. in cost.

The imports of **Maize**, which last year took over thirteen and a half millions sterling of British money, showed an advance of 13·6 per cent. in quantity and over 26·9 per cent. in value. In Maize Meal there was an increase of over 7 per cent.

“Other kinds of corn and meal” were imported in less quantity last year by 7·9 per cent., while we spent on this class of food over 7 per cent. more than in the previous year.

THE WEATHER OF THE PAST AGRICULTURAL YEAR.

THE past agricultural season opened with a fairly dry autumn, a legacy from the splendid summer of 1911. The winter proved, however, unusually wet, and in places which were not quite submerged the land fell into a thoroughly soddened and water-logged state. Only one frost of any real severity was experienced (at the close of January and the beginning of February), and in that case the cold scarcely lasted long enough to have any very beneficial effect upon the soil. The spring was much drier, but with a predominance of harsh winds the progress of vegetation was slow, the hay crop being as a rule poor, and the in-gathering seriously interrupted by the broken weather of June. The summer witnessed a steady deterioration in the atmospherical conditions, and proved in the end one of the worst on record. In June and July there were two or three spells of warmth, but the longest of them barely lasted a week. August was irremediably bad from beginning to end, a total deficiency of summer heat being accompanied by frequent heavy storms of rain, culminating on the 26th and 27th in an unprecedented downpour in East Anglia, where floods of unparalleled severity were

experienced. From nearly all parts of the country doleful reports arrived of crops beaten down and acres of land under water, any attempt at harvesting work being in many localities absolutely impossible. In September a welcome change set in, all too late for the disappointed holiday maker, but of inestimable benefit to the farmer, who was enabled in many cases to secure his crops in a far better condition than could ever at one time have been expected. A fair amount of dry weather was experienced also in the autumn, so that the agricultural season of 1912-13 started favourably. With the experiences of the earlier twelvemonths in view it was, however, difficult for the farmer to frame any very sanguine estimates with regard to the future. The opinion may, however, be safely hazarded that whatever the present season may bring forth it is scarcely likely to witness a repetition of so distressful a summer as that of 1912.

THE WINTER OF 1911-12.

The winter opened with a long spell of mild winds from between south and west, and extremely changeable weather, December being upon the whole one of the mildest, and certainly one of the wettest, on record. At a number of places in the west and south the total rainfall amounted to considerably over 10 in., and in some of the hilly districts to more than 20 in., the repeated heavy falls in the earlier half of the month resulting in serious floods in the Thames valley, in South Wales, and in the Shannon watershed. The only frost of any importance occurred between the 6th and 8th of the month, when the sheltered thermometer fell slightly between 25° in several isolated places. On the grass the minimum readings were naturally a few degrees lower, the thermometer falling to 17° at Wisley, in Surrey, and to 12° at Llangammarch Wells.

The first three weeks of January witnessed a further predominance of mild weather, but wintry spells occurred about the 7th or 8th, and again between the 17th and 20th. On the latter occasion the sheltered thermometer fell at least 10° below the freezing point in many localities, and between the 15th and 17th heavy falls of snow occurred in the north, the depth, in level places, amounting here and there to between eight inches and a foot. After the 20th the mild equatorial winds, which had hitherto prevailed with little intermission, were replaced by cold breezes from the northward and north-eastward. Towards the close of the month a frost, which proved to be the sharpest of the whole winter, set in and continued throughout the early days of February, the temperatures recorded being in some localities the lowest since the severe winter of 1894-95.

The greatest cold occurred at various times between February 2 and 5, when the thermometer in the screen fell to 10° or less in many parts of England, and slightly below zero in central Scotland. On the surface of the ground readings below zero were reported also in scattered parts of inland England. On the 6th a rapid thaw took place, and for the remainder of the month mild southerly and south-westerly winds prevailed very commonly, the thermometer being, as a rule, considerably above its average level. The highest temperatures of the winter occurred on the two closing days, when the thermometer touched 60° in many parts of the country and reached 61° at Minehead.

For the season, as a whole, the mean temperature was everywhere above the average, and in the eastern and south-eastern parts of England the excess was considerable. Rainfall was unusually frequent, and in most English districts the total for the winter amounted to at least half as much again as the average. In the midland counties the excess was as much as 68 per cent., and in the south-east it was no less than 78 per cent. Bright sunshine was fairly abundant in December, but very deficient in January and February. The amount for the whole winter was therefore below the normal. Over the eastern and south-eastern parts of England the loss amounted on an average to about half an hour per day.

THE SPRING OF 1912.

The spring season opened with a continuance of the mild unsettled weather which had prevailed, with little interruption, throughout the winter months.

In March there was a large predominance of winds from the south-westward, and in many parts of central and southern England the month was the mildest on record. Owing, however, to the general cloudiness of the weather the day temperatures were seldom very high, the only shade readings exceeding 60° being observed between the 25th and 27th, when the thermometer rose to 62° or 63° in many parts of the country, and touched 64° at Chelmsford. The cloud canopy which shut off the heating effect of the sun's rays served also as an effectual check on nocturnal radiation, and, in comparison with the average, the nights were much warmer than the days. The only frosts of any consequence occurred between the 20th and 23rd, when the sheltered thermometer fell to between 27° and 29° in many parts of the country, the readings on the grass being slightly below 20° in some parts of the midland and northern counties. Rain was frequent, and in the west and south often very heavy, the total for the month amounting to three times as much as the average at Swarraton (Hants), to

more than three times as much at Cullompton, and to nearly three and a half times as much at Woolacombe, in North Devon. On the 4th, and again on the 21st, an exceedingly heavy squall of wind, accompanied by sharp thunderstorms, passed rapidly from west to east across the south of England. At Falmouth the wind on the evening of the 4th reached a velocity of 98 miles an hour, and at Dover a velocity of 71 miles was recorded the same night.

April opened with strong northerly winds and showers of snow, hail or sleet, and on the night of the 1st a sharp ground frost occurred in most districts. Further sharp frosts were experienced on the 10th and 11th and on the 17th and 18th, but at the close of the first week the thermometer rose to a high level, readings of 68° and 69° being observed in several parts of the eastern counties. The warmest April weather occurred, however, between the 19th and 21st, when the thermometer rose above 70° in many localities, and touched 73° in London (at Camden Square). A period of dry weather which set in over southern England in the closing week of March afterwards became general, and in many parts of the country there were not more than two or three days in April with a measurable quantity of rain, some places in the south having only one rainy day, and Dungeness none at all. Bright sunshine was unusually prevalent, especially along the south and east coasts, where the mean daily duration amounted in many instances to more than nine hours.

May was mostly cloudy and changeable, but, as a rule, dry. The thermometer rose to a fairly high level on the 2nd, but the warmest spring weather occurred on the 11th, when shade readings of 80° and upwards were recorded in several parts of eastern and southern England, the thermometer at Greenwich touching 83°. Sharp ground frosts occurred in the midlands on the nights of the 4th and 5th, and destructive frosts were experienced in the west and north on the 13th or 14th, and very generally between the 24th and 26th. On the night of the 25th the thermometer on the grass fell 8° below the freezing point as far south even as Greenwich. Heavy falls of rain were experienced in many districts between the 20th and 22nd, more especially over the northern half of England. On the 22nd as much as 1·5 in. was recorded at Scarborough, Garforth, and Ross (Hereford).

For the spring as a whole the mean temperature was above the average, the excess of warmth being greatest in the eastern and north-eastern counties. Rainfall was in excess of the normal in the midlands and the south-west of England, but very deficient in the eastern counties: in other parts of the country it was in fair agreement with the average. Bright

sunshine was more abundant than usual in the south-east, and less so in the south-west; elsewhere there was no great divergence from the normal.

THE SUMMER OF 1912.

The earlier part of the summer was marked by two or three short spells of warmth, and in this respect the season compared favourably with those of 1879 and 1888, when there was practically no summer weather at all. With the advance of time, however, the weather steadily deteriorated, a complete break in the latter part of July leading up to one of the coldest and wettest Augusts on record.

The first fortnight in June was extremely cool and unsettled with frequent thunderstorms, accompanied in many places by exceedingly heavy rain. Some of the worst thunderstorms occurred between the 9th and the 11th when hail and sleet fell in the west and north, but heavy downpours of rain were experienced on the 17th and 19th, the falls of the 17th covering a very wide area and reaching their maximum severity in North Wales. At Lincoln an exceptionally violent storm was accompanied by a fall of rain amounting to nearly an inch in twenty minutes, and at Claypole on the same day a fall of nearly three quarters of an inch was recorded in seventeen minutes. Towards the close of the third week in June a brief spell of summer warmth was experienced over the south-eastern quarter of England, the thermometer on the 19th or 22nd rising to 80° and upwards in many localities, and touching 84° at Greenwich and 85° at Isleworth. The lowest June temperatures were recorded between the 3rd and 5th, when slight ground frosts occurred in many parts of the country, and as far south as Greenwich.

Two brief spells of summer warmth were experienced in the first half of July, one between the 4th and 6th, the other between the 12th and 17th. In the earlier instance the thermometer on the 6th rose above 70° in nearly all districts, and touched 77° in London (at Camden Square). The later spell lasted somewhat longer, and produced the highest temperatures of the whole summer. On the 12th the thermometer in the shade rose above 85° in many parts of eastern, central, and southern England, and touched 90° at Greenwich and 91° at Tottenham, Camden Square, and Isleworth. On the 14th and 15th the heat was more general, shade readings of 85° and upwards being observed over a large portion of Great Britain; at Camden Square the thermometer reached 90°, and at Portsmouth it touched 95°. After the 17th a rapid fall of temperature occurred, and on the 19th the maximum readings of the thermometer were in many places below 60° or nearly

30° lower than those of the preceding three or four days. Between the 24th and 26th another slight touch of warmth occurred, the thermometer rising a trifle above 80° in the London district. The closing days of July were, however, for the most part cool and unsettled, with frequent thunderstorms and heavy falls of rain in nearly all districts. At many places in the north and east of England the total rainfall for the month was more than twice as much as the normal. In the north the weather was also extremely cloudy, the duration of sunshine at York and Durham being considerably less than one half of the average.

In August the absence of summer warmth was remarkable, the mean temperature of the month being the lowest observed for at least forty years past. Only at a few scattered places in the south did the thermometer ever pass beyond 70°, and at a large number of places in the west and north it never reached 65°, the daily maxima over the country generally being often below 60°. Thunderstorms were less common than in June or July, but heavy falls of rain were experienced in all districts, most frequently, perhaps, in the west and south-west of England, where the total for the month amounted to between two and two and a half times as much as the average. The worst rainstorm occurred, however, in what is usually regarded as one of the driest parts of the country. Commencing quite early on the 26th a torrential downpour in East Anglia lasted for some twenty-six or thirty hours, and in an oval area covering about 180 square miles, and extending from the Norfolk Broads to Wymondham, the total for the forty-eight hours ended with the morning of the 27th was considerably over 7 in. At stations in Norwich the fall in the twenty-four hours ended with 9 a.m. on the 27th amounted to between 6·5 in. and 6·7 in., while at Brundall, about six miles to the south-eastward of the city, it was no less than 7·3 in. Since the year 1860 there were very few instances of so wet a day in any part of the United Kingdom, and it may therefore readily be concluded that for one of the driest portions of the country the East Anglian fall of August 26 was easily, and by a long way, a record. The excessive downpour resulted in disastrous floods, covering a wide area, and causing immense damage to crops and to structures of various kinds, with some loss of life.

For the summer, as a whole, the mean temperature was considerably below the average, but in most districts it was higher than in the inclement summers of 1879 and 1888. In the midland counties the season was warmer than in 1888 but cooler than in 1879. Rainfall was greatly in excess of the normal. In the midland and south-western districts nearly twice as much as the average quantity was

[Continued on page 356.]

**Rainfall, Temperature, and Bright Sunshine experienced over
England and Wales during the whole of 1912, with Average
and Extreme Values for Previous Years.**

| Districts | RAINFALL | | | | | | | |
|---|-------------------------|--------------|-------------------------|--------------------|-------------------------|--------------|------------|------------------------|
| | TOTAL FALL | | | | NO. OF DAYS WITH RAIN | | | |
| | For 46 years, 1866-1911 | | | | For 31 years, 1881-1911 | | | |
| | In 1912 | Aver- age | Extremes | | In 1912 | Aver- age | Extremes | |
| | | | Driest | Wettest | | | Driest | Wettest |
| North-eastern . | In. 31.1 | In. 25.5 | In. 19.9 (1884) | In. 37.2 (1872) | 207 | 186 | 162 (1884) | 208 (1894) |
| Eastern . . . | 29.7 | 24.9 | 19.1 (1874 and 1887) | 33.1 (1872) | 199 | 181 | 156 (1898) | 205 (1894) |
| Midland . . . | 34.6 | 27.5 | 19.2 (1887) | 39.8 (1872) | 189 | 180 | 148 (1887) | 210 (1882) |
| South-eastern . | 32.5 | 28.9 | 21.5 (1887) | 41.7 (1872) | 186 | 173 | 137 (1899) | 197 (1882 and 1903) |
| North-western, with North Wales . . . | 39.6 | 37.7 | 24.9 (1887) | 59.2 (1872) | 214 | 200 | 163 (1887) | 226 (1903) |
| South-western, with South Wales . . . | 48.2 | 41.7 | 28.3 (1887) | 68.6 (1872) | 218 | 197 | 159 (1887) | 235 (1882) |
| Channel Islands ¹ | 41.4 | 32.1 | 26.2 (1887) | 39.5 (1882) | 226 | 209 | 169 (1899) | 251 (1886) |

| Districts | MEAN TEMPERATURE | | | | HOURS OF BRIGHT SUNSHINE | | | |
|---|-------------------------|--------------|-------------|-------------------------|--------------------------|--------------|-------------|-------------|
| | For 46 years, 1866-1911 | | | | For 31 years, 1881-1911 | | | |
| | In 1912 | Aver- age | Extremes | | In 1912 | Aver- age | Extremes | |
| | | | Coldest | Warmest | | | Cloudiest | Sunniest |
| | ° | ° | ° | ° | | | | |
| North-eastern . | 47.6 | 47.6 | 44.8 (1879) | 49.0 (1898) | 1134 | 1335 | 1006 (1885) | 1601 (1906) |
| Eastern . . . | 49.5 | 48.7 | 45.6 (1879) | 49.8 (1868 and 1898) | 1400 | 1586 | 1267 (1888) | 1864 (1899) |
| Midland . . . | 48.3 | 48.5 | 45.6 (1879) | 51.1 (1868) | 1156 | 1409 | 1173 (1888) | 1715 (1893) |
| South-eastern . | 50.0 | 49.8 | 46.7 (1879) | 51.4 (1898) | 1470 | 1617 | 1245 (1888) | 1983 (1899) |
| North-western, with North Wales . . . | 48.4 | 48.6 | 45.7 (1879) | 50.3 (1868) | 1227 | 1401 | 1198 (1888) | 1683 (1901) |
| South-western, with South Wales . . . | 49.7 | 50.0 | 48.1 (1888) | 52.8 (1868) | 1294 | 1647 | 1459 (1888) | 1964 (1893) |
| Channel Islands ¹ | 52.4 | 52.2 | 50.5 (1885) | 54.1 (1899) | 1647 | 1903 | 1710 (1888) | 2300 (1893) |

NOTE.—The above Table is compiled from information given in the Weekly Weather Report of the Meteorological Office.

¹ For the Channel Islands the "Averages" and "Extremes" of Rainfall and Mean Temperature are for the thirty-one years, 1881-1911.

The Rainfall of 1912 and of the previous Ten Years, with the Average Annual Fall for a long period, as observed at thirty-eight stations situated in various parts of the United Kingdom.

| Stations | 1912 | | Rainfall of Previous Years | | | | | | | | | | Average rain- fall |
|---|------------------------|---|----------------------------|------|------|------|------|------|------|------|------|------|--------------------------|
| | Total rain- fall | Dif- ference from ave- rage | 1911 | 1910 | 1909 | 1908 | 1907 | 1906 | 1905 | 1904 | 1903 | 1902 | |
| | | | In. | In. | In. | In. | In. | In. | In. | In. | In. | In. | |
| ENGLAND AND WALES: | | | | | | | | | | | | | |
| Durham | 29'2 | + 7 | 23'0 | 24'9 | 24'8 | 19'4 | 24'8 | 23'8 | 19'2 | 19'0 | 30'8 | 18'5 | 27'2 |
| York | 33'0 | + 30 | 25'1 | 24'6 | 24'8 | 21'8 | 25'6 | 22'8 | 20'7 | 20'8 | 30'3 | 18'7 | 25'3 |
| Norwich | 35'0 | + 28 | 26'7 | 31'8 | 27'8 | 25'2 | 26'3 | 28'5 | 23'0 | 21'5 | 29'4 | 22'3 | 27'3 |
| Yarmouth | 33'6 | + 33 | 20'4 | 28'5 | 24'2 | 22'5 | 21'9 | 28'0 | 22'6 | 21'0 | 25'1 | 21'4 | 25'3 |
| Cambridge | 27'3 | + 20 | 19'0 | 22'8 | 23'1 | 17'6 | 21'2 | 22'4 | 19'0 | 17'6 | 30'5 | 15'8 | 22'7 |
| Rothamsted | 33'6 | + 20 | 27'6 | 29'7 | 26'8 | 23'4 | 25'3 | 26'8 | 24'8 | 23'2 | 36'3 | 19'6 | 27'9 |
| Nottingham | 30'1 | + 21 | 19'4 | 24'7 | 25'2 | 21'3 | 23'5 | 21'8 | 18'6 | 20'0 | 32'2 | 21'5 | 24'8 |
| Cheadle | 38'9 | + 19 | 23'8 | 36'5 | 37'7 | 33'3 | 31'9 | 34'3 | 26'7 | 26'3 | 39'2 | 26'4 | 32'8 |
| Hereford | 32'9 | + 22 | 25'4 | 36'4 | 24'0 | 23'9 | 29'7 | 23'6 | 24'0 | 25'0 | 37'8 | 24'3 | 27'0 |
| Cirencester | 39'2 | + 28 | 24'3 | 33'2 | 32'1 | 24'5 | 28'9 | 26'2 | 25'1 | 28'8 | 41'1 | 25'1 | 30'7 |
| Oxford | 32'5 | + 30 | 20'9 | 28'9 | 27'5 | 23'9 | 26'9 | 24'0 | 21'0 | 22'7 | 35'9 | 16'7 | 25'0 |
| London (Kew) | 28'0 | + 17 | 23'1 | 25'5 | 23'7 | 22'2 | 23'8 | 23'6 | 22'6 | 21'2 | 38'2 | 2' 5 | 24'0 |
| Hastings | 32'0 | + 10 | 29'6 | 28'9 | 31'4 | 22'0 | 23'3 | 28'7 | 26'9 | 24'6 | 32'3 | 23'0 | 29'1 |
| Southampton | 37'3 | + 21 | 30'4 | 33'6 | 36'1 | 27'8 | 30'8 | 33'1 | 26'2 | 31'0 | 43'2 | 27'4 | 30'9 |
| Stonyhurst | 54'1 | + 16 | 44'2 | 53'3 | 48'8 | 48'3 | 50'0 | 49'7 | 38'8 | 39'6 | 58'9 | 36'8 | 46'8 |
| Manchester (City) | 40'6 | + 17 | 31'1 | 37'5 | 37'0 | 32'5 | 33'9 | 37'0 | 29'8 | 26'5 | 38'7 | 26'5 | 34'7 |
| Liverpool | 30'2 | + 5 | 25'3 | 28'6 | 28'4 | 28'9 | 26'6 | 28'1 | 24'0 | 25'1 | 34'4 | 25'6 | 28'8 |
| Llandudno | 33'0 | + 7 | 30'5 | 36'7 | 32'0 | 30'8 | 26'3 | 31'6 | 26'1 | 26'0 | 38'5 | 25'0 | 30'8 |
| Pembroke | 41'0 | + 17 | 38'6 | 38'9 | 33'1 | 38'5 | 37'2 | 42'5 | 28'2 | 31'8 | 45'8 | 30'9 | 35'1 |
| Clifton | 44'7 | + 29 | 29'0 | 42'4 | 36'8 | 26'6 | 34'3 | 30'1 | 25'0 | 30'9 | 42'8 | 26'5 | 34'6 |
| Cullompton | 47'8 | + 34 | 35'0 | 46'8 | 34'4 | 27'5 | 33'4 | 33'9 | 28'1 | 34'9 | 42'7 | 30'8 | 37'7 |
| Plymouth | 47'0 | + 31 | 37'6 | 44'3 | 35'2 | 31'0 | 36'3 | 33'4 | 30'5 | 41'4 | 45'8 | 30'9 | 35'9 |
| Scilly (St. Mary's) | 36'5 | + 9 | 34'2 | 36'6 | 27'0 | 24'7 | 29'3 | 29'8 | 27'5 | 34'4 | 39'9 | 25'3 | 33'6 |
| Jersey (St. Aubin's) | 43'3 | + 27 | 31'7 | 44'4 | 31'7 | 25'2 | 28'6 | 29'2 | 30'3 | 37'3 | 38'2 | 30'4 | 34'2 |
| | | | | | | | | | | | | | |
| ² Mean for the whole of England and Wales } | 36'7 | + 18 | 28'8 | 34'5 | 31'3 | 26'6 | 29'9 | 29'9 | 25'6 | 28'0 | 37'5 | 26'7 | 31'0 |
| | | | | | | | | | | | | | |
| SCOTLAND: | | | | | | | | | | | | | |
| Stornoway | 54'7 | + 13 | 48'3 | 53'0 | 46'2 | 52'6 | 43'8 | 42'2 | 50'7 | 55'7 | 62'1 | 46'3 | 48'6 |
| Wick | 32'5 | + 11 | 27'4 | 32'5 | 33'6 | 32'0 | 29'6 | 33'2 | 32'3 | 25'3 | 35'9 | 26'4 | 29'3 |
| Aberdeen | 29'3 | - 5 | 27'5 | 27'7 | 30'4 | 28'0 | 28'7 | 31'5 | 28'5 | 23'7 | 36'3 | 27'3 | 30'7 |
| Balmoral ³ | 38'3 | + 6 | 29'9 | 37'5 | 30'8 | 26'2 | 31'8 | 39'1 | 35'6 | 24'9 | 44'1 | 31'8 | 36'0 |
| Leith | 25'3 | + 6 | 19'9 | 25'8 | 27'1 | 22'1 | 30'7 | 30'2 | 19'2 | 23'4 | 30'9 | 16'4 | 23'8 |
| Marchmont | 31'9 | - 7 | 31'7 | 28'9 | 34'2 | 30'7 | 33'3 | 38'9 | 27'4 | 26'1 | 38'6 | 24'4 | 34'4 |
| Fort Augustus | 50'3 | + 13 | 44'8 | 42'2 | 37'4 | 43'9 | 42'0 | 51'6 | 43'6 | 44'4 | 66'0 | 35'6 | 44'6 |
| Glasgow | 41'0 | + 6 | 36'3 | 39'2 | 39'3 | 35'8 | 42'6 | 40'1 | 30'7 | 33'7 | 53'3 | 29'1 | 38'7 |
| | | | | | | | | | | | | | |
| ² Mean for the whole of Scotland } | 45'4 | + 9 | 41'7 | 43'2 | 41'8 | 43'1 | 44'5 | 46'3 | 41'4 | 42'1 | 57'1 | 43'0 | 41'8 |
| | | | | | | | | | | | | | |
| IRELAND: | | | | | | | | | | | | | |
| Belfast | 44'7 | + 33 | 36'3 | 40'6 | 35'7 | 38'7 | 38'1 | 36'2 | 31'8 | 31'8 | 42'3 | 35'8 | 33'6 |
| Markree Castle | 49'1 | + 17 | 42'3 | 53'5 | 40'7 | 47'3 | 45'2 | 44'6 | 39'0 | 44'9 | 54'1 | 38'4 | 42'0 |
| Armagh | 35'8 | + 12 | 27'6 | 32'5 | 28'9 | 33'1 | 31'6 | 30'1 | 29'9 | 30'9 | 36'3 | 31'7 | 31'9 |
| Dublin | 27'7 | - 1 | 23'5 | 35'4 | 26'9 | 23'8 | 27'0 | 22'8 | 25'3 | 22'2 | 31'6 | 29'4 | 28'0 |
| Birr Castle (Parsons- town) | 34'5 | + 5 | 31'0 | 34'2 | 29'6 | 33'4 | 33'9 | 32'6 | 25'7 | 32'9 | 40'8 | 28'2 | 33'0 |
| Kilkenny | 36'4 | + 9 | 36'3 | 37'4 | 30'1 | 33'5 | 32'4 | 28'7 | 25'0 | 31'5 | 42'0 | 33'1 | 33'3 |
| | | | | | | | | | | | | | |
| ² Mean for the whole of Ireland. } | 40'7 | + 3 | 36'5 | 41'0 | 35'3 | 39'2 | 39'7 | 36'7 | 34'6 | 38'9 | 47'9 | 37'2 | 39'5 |

¹ The Average Fall is in nearly all cases deduced from observations extending over the thirty-five years 1871-1905.

² The Mean Rainfall for each country is based upon observations made at a large number of stations in addition to those given above.

³ The figures for the years prior to 1906 are for Braemar, which ceased reporting after 1905.

collected, and in the Scilly and Channel Islands considerably more than twice as much. The duration of bright sunshine was unusually small, most districts receiving on an average at least a couple of hours per day less than their due share. In the north-east of England, where cloud was most prevalent, the mean amount per day was less than $3\frac{1}{2}$ hours as against an average of nearly 6 hours, a loss of $2\frac{1}{2}$ hours per day.

THE AUTUMN OF 1912.

The absence of seasonable warmth which was so noticeable during the latter part of the summer continued throughout the earlier half of the autumn, no temperatures appreciably in excess of the average being reported until November. The season was also cloudy, but happily for the farmer it was mostly dry, the fine weather of September proving an invaluable boon in the numerous localities in which the cereals, though cut, were still standing in the fields.

In the south the improvement in the weather set in quite early in September, when an anticyclone began to spread over the country from the south-westward. After the first week the improvement became general, and at many places in the western and southern parts of the country an entire absence of rain lasted over twenty-six or twenty-seven days. The wind was, however, mostly from some cool quarter, and, as the sky was usually more or less cloudy, the thermometer failed to rise to any high level. In the south-eastern quarter of England, usually the warmest part of the kingdom, no shade reading as high as 70° was recorded, but on the 16th the thermometer exceeded that level at several places in the west and north, and touched 73° at Whitby. Up to the 28th of the month it seemed quite likely that the absence of rain would constitute a record for September. On the two last days, however, a very heavy fall occurred in the south and east of England, the total amounting in many places to between 3 in. and 4 in. As a result of this downpour, and in spite of the previous long drought, the aggregate rainfall for the month over the eastern half of the country was in several localities well in excess of the average.

The plumping rains experienced at the end of September were followed by a fairly long spell of dry weather, and between October 9 and 11 and on the 13th and 14th the thermometer rose to between 60° and 65° in most districts. Night frosts were, however, very common, the thermometer on the grass falling on the 4th or 5th to 20° or less in many places and to 16° at Birmingham. After the 20th of the month the weather became far less settled, and on the 26th and 27th a heavy fall of rain occurred in all the more western districts.

Throughout the whole of October there was an unusual tendency for the formation of fog and mist. In the London district fog occurred on as many as fourteen days, just double the average number for the month, and greater than in any October since 1888.

November was extremely changeable throughout. In the opening days sharp night frosts occurred, but on the 7th and 8th, when a mild southerly breeze sprang up, the thermometer rose above the normal, shade readings of 60° and upwards being recorded in several isolated parts of the country. Strong gales from the westward and heavy falls of rain occurred very generally on the 10th and 11th, a subsequent veering of the wind to north-west and north being accompanied by thunderstorms in many districts and by showers of sleet or snow in the north. Ground frost occurred on the 15th and 16th and again on the 18th, the exposed thermometer falling on the latter occasion to a minimum of 17° at Newton Rigg, in Cumberland. Violent south-westerly to westerly gales occurred on the 26th and 27th, and later on, when the wind subsided, a frost of great severity set in over the entire northern half of the country, and continued until about the 3rd of December. On November 29 and 30 the thermometer fell below 10° at many places in North Britain, the lowest English readings reported being 3° at Scaleby and Allan's Green (Northumberland) and 6° at Newton Rigg. Heavy falls of snow occurred at the same time in many northern districts, and slight falls locally in the south.

For the season, as a whole, the mean temperature was below the average, the deficit being considerable in the south-east. Rainfall was equal to the normal in the eastern counties but deficient elsewhere, the driest weather occurring in the midlands. In the eastern and central parts of the country the total duration of bright sunshine was small, but in other districts it was in fair agreement with the average.

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THE TRIALS OF CORN AND SEED DRILLS, 1912.

THE last trials of Corn and Seed Drills organised by the Royal Agricultural Society of England took place near Bedford in 1874—thirty-eight years ago. It was therefore with considerable interest and some curiosity that agriculturists and implement makers looked forward to the trials of 1912, in the hope that as marked a development might be demonstrated between the prize drills of 1874 and 1912 as was the case between the first recorded drill invented by Jethro Tull on his farm near Wallingford, about the year 1700, and the prize implements of 1874. Anything like such a development was not, however, forthcoming. Indeed, the trials of the machines disclosed that very little alteration or improvement of real importance had been made, and that the prize drill of 1874 very closely resembles the prize drill of 1912.

It is a matter for regret that so few entries were received, and that many of the largest makers in this country did not compete, in consequence of which the competition suffered considerably in interest.

The trials of 1912 were carried out on the Stainton Manor Farm (about eight miles from Doncaster), the property of the Earl of Scarborough, by kind permission of the tenant, Mr. C. D. Nicholson. The trials were originally fixed to take place on March 26 and following days, but owing to the unfit condition of the land through bad weather at that time they had to be postponed until April 18 and 19.

The land selected for the first operations was a fairly light loam overlying limestone rock—typical “turnip and barley land.” It was very clean and very level. Turnips had been fed off by sheep, the land ploughed in February, rolled in March, and since harrowed three times. There was a good tilth, and it was in first rate order for drilling the intended barley crop. The weather was dry and fine throughout the trials.

There were two classes, and four prizes were offered by the Society, viz. :—

| | 1st Prize | 2nd Prize |
|---|-----------|-----------|
| | £ | £ |
| Class I. Drills for Corn and Pulse | 10 | 5 |
| Class II. Drills for Grass and Clover, coulter and broadcast. | 10 | 5 |

The special attention of the Judges was called to the following points :—

- (1) Ease and accuracy of adjustment.
- (2) Even distribution of seed.

- (3) Adaptability to various seeds.
- (4) Weight.
- (5) Simplicity of construction combined with strength.
- (6) Number of attendants.
- (7) General efficiency.
- (8) Price.

There were eight entries in Class I and one entry in Class II., all of which were presented for trial. As several of the competitors showed two or more machines, the trials were arranged in the following order, so that no competitor should have to run his drills consecutively. This order of running was maintained throughout the trials:—

| | | |
|---------|------------------------------|-----------------------|
| First | Kell & Co., Ltd. | "British Economical." |
| Second | Thomas Baker & Sons. | "Superior." |
| Third | Teasdale Brothers, Ltd. | |
| Fourth | Francis Walker & Sons. | |
| Fifth | Kell & Co., Ltd. | "John Bull." |
| Sixth | Martins Cultivator Co., Ltd. | |
| Seventh | Teasdale Brothers, Ltd. | |
| Eighth | Francis Walker & Sons. | "Anglo-Colonial." |

The judging was conducted on the principle of giving marks for the various points of merit. These were divided into ten headings, and each dealt with separately. The following table gives a general statement of the conditions of trial.

CLASS I.—CORN AND PULSE DRILLS.

| Name of Exhibitor | Kell & Co., Ltd. | Thomas Baker & Sons | Teasdale Bros., Ltd. | Francis Walker & Sons | Kell & Co., Ltd. | Martins Cultivator Co., Ltd. | Teasdale Bros., Ltd. | Francis Walker & Sons |
|----------------------|------------------|---------------------|----------------------|-----------------------|------------------|------------------------------|----------------------|-----------------------|
| Order of trial | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| Weight (cwts.) | 8½ | 8½ | 8½ | 8½ | 9½ | 8½ | 8½ | 7½ |
| Number of rows | 13 | 12 | 11 | 12 | 13 | 13 | 13 | 13 |
| Number of attendants | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Number of horses | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 |
| Price | £ 28 | £ 24 | £ 24 | £ 23 10 | £ 25 | £ 24 | £ 22 | £ 21 10 |

The trials began at 9 a.m. on April 18. The competitors were directed to sow barley at the rate of 3 bushels per acre. The ground had been marked out in equal plots containing 1,490 square yards. The length of "run" averaged 298 yards. Five stones of an exceptionally good sample of barley was

weighed out and placed in the seed boxes of all the competing drills. After each machine finished drilling its allotted area it awaited the completion of this part of the trial, and then the barley remaining in the seed boxes was carefully weighed and the amount sown in the plots of equal areas by the respective drills was found to be as follows :—

| | | St. | Lb. |
|--------------|------------------------------|-----|-----|
| Trial No. 1. | Kell & Co., Ltd. | 3 | 2½ |
| " " 2. | Thomas Baker & Sons | 3 | 1½ |
| " " 3. | Teasdale Bros., Ltd. | 4 | 6¾ |
| " " 4. | Francis Walker & Sons | 3 | 9½ |
| " " 5. | Kell & Co. | 3 | 7 |
| " " 6. | Martins Cultivator Co., Ltd. | 3 | 7 |
| " " 7. | Teasdale Bros., Ltd. | 4 | 2¾ |
| " " 8. | Francis Walker & Sons | 4 | 0 |

It should be noted that to sow the area of 1,490 square yards (roughly one-third of an acre) at the required rate of 3 bushels per acre, about 4 stones of seed is required (allowing the barley to weigh 56 lb. per bushel).

The efficiency of the pressure arrangements was the next test. The drills were run empty over unopened land in a field adjoining the barley plots. This land had been ploughed after wheat and was intended for a turnip crop. It had been fallowed down by digger ploughs somewhat, but the surface was rather rough and hard and slightly caked, and provided a suitable test ground for this purpose.

Pressure was obtained in practically all the exhibits by means of spiral springs operated on the coulter bars by means

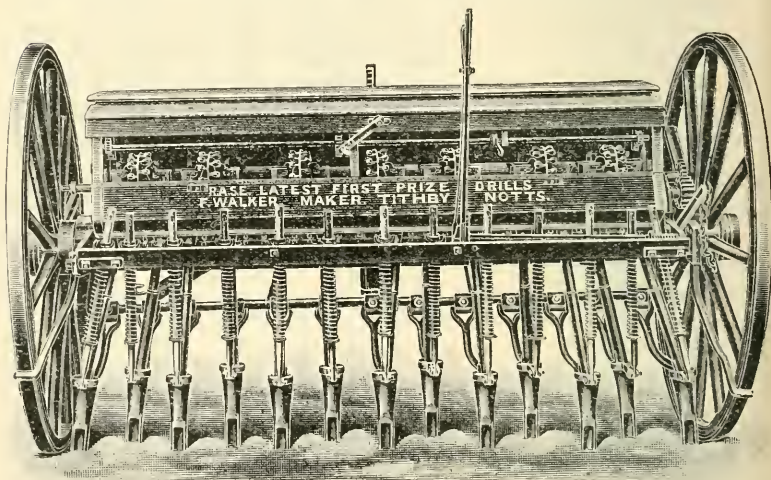


FIG. 1.—F. Walker & Sons' First Prize "Anglo-Colonial" 13-row Corn and Seed Drill, Class I.

of adjustable levers. Messrs. Walker's "Anglo-Colonial" was fitted with this form of press, as well as the old-fashioned weights. This second string has a distinct advantage in dealing with very hard ground. The pattern of coulters used also makes a great difference in cutting into hard ground, and materially assist any pressure arrangement in proportion to their adaptability for this purpose. The pattern of coulters adopted by Messrs. Walker & Sons and also by Messrs. Kell & Co. on their "John Bull" seems hard to beat, and undoubtedly greatly increased the effectiveness of their pressure arrangements.

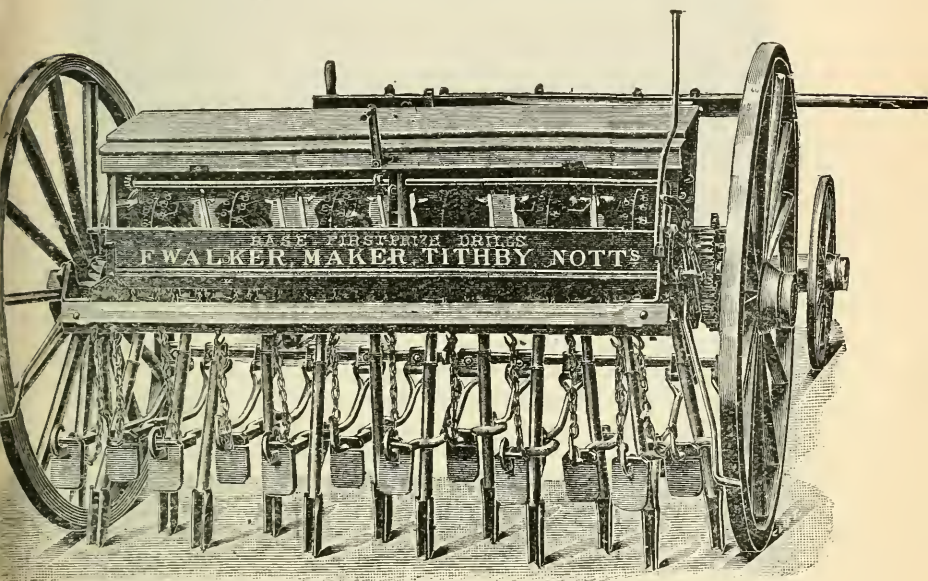


FIG. 2.—F. Walker & Sons' Second Prize 12-row Corn and Seed Drill, Class I.

The Judges were unable to recognise any particular advantage in the American disc type of coulter exhibited by Messrs. Thomas Baker & Sons on the conditions under which these trials were held, though no doubt they may have their merits under certain conditions.

It was next arranged to test the "adaptability" of the drills, and with this object the competitors were asked to alter their drills and sow seven rows of beans.

Three and a half stones of beans were placed in each machine, and instructions were given to sow the beans at the rate of one sack per acre, over a "run" of 250 yards.

The seed was rather indifferent, in that it was not as clean as it might have been, but it was the same for all.

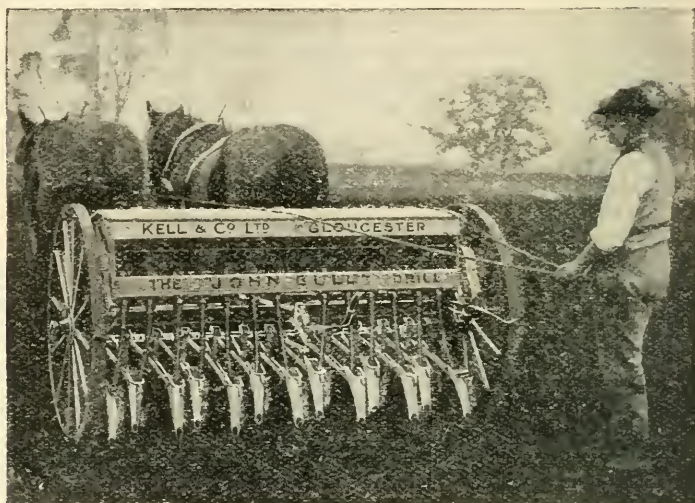


FIG. 3.—Kell & Co's H.C. "John Bull" 13-row Corn and Seed Drill, Class I.

This test proved rather severe on some of the competitors. Messrs. Martin's exhibit, provided with a new worm forced feed, slipped its gearing several times, and the beans jammed in the worm feed wheels, and ultimately the machine retired from this run. The "Superior" also showed some difficulty in adjusting the coulters to even distances, and also in getting the seed in at uniform depths. It clearly showed the superiority of the old "cup feed" over any other form of feed exhibited.

Regularity of distribution by individual coulters was next tested. For this purpose a small canvas bag was attached to each coulter, and with a supply of peas the machines were driven over a length of 200 yards, sowing into the bags at the rate of 3 bushels per acre. On weighing the bags it was found that:—

| | | |
|--------|---|---|
| No. 1. | The "British Economical." (13 coulters). | Varied from $1\frac{7}{8}$ to $1\frac{1}{4}$ lb. per bag. |
| No. 2. | The "Superior" (12 coulters). | Varied from $1\frac{1}{4}$ to 1 lb. per bag. |
| No. 3. | Teasdale's Cup Feed (11 coulters). | Varied from $2\frac{1}{2}$ to $1\frac{3}{4}$ lb. per bag. |
| No. 4. | Walker & Sons' Corn Drill. (12 coulters). | Varied from $1\frac{5}{8}$ to $1\frac{1}{4}$ lb. per bag. |
| No. 5. | Kell & Company's "John Bull." (13 coulters). | Varied from $1\frac{5}{8}$ to $1\frac{1}{4}$ lb. per bag. |
| No. 6. | Martin & Company's Forced Feed. (13 coulters). | Varied from $1\frac{3}{4}$ to $1\frac{1}{2}$ lb. per bag. |

| | | |
|--------|---|-----------------------------------|
| No. 7. | Teasdale's Forced Feed. (13 coulter). | Choked. |
| No. 8. | Walker's "Anglo-Colonial." (13 coulter). | Varied from 1½ to 1¼ lb. per bag. |

The draught of the machines was taken on a dynamometer supplied by the Society. The coulter of each were set to a depth of 5 in., and the figures were read whilst the machines worked over a 200 yard "run" on unopened land.

The following mean results are given in the first column, and the weights of the machines, weighed in the presence of the Judges immediately after the trials, in the second column:—

| | Average Draught. cwt. | Weight of Machine. cwt. |
|---|-----------------------------|-------------------------------|
| No. 1. Kell, "British Economical" | 5 | 8½ |
| No. 2. Baker, "Superior" | 6½ | 8½ |
| No. 3. Teasdale (Cup Feed) | 5 | 8½ |
| No. 4. Walker (Corn Drill) | 6½ | 8½ |
| No. 5. Kell, "John Bull" | 7 | 9½ |
| No. 6. Martin | 5½ | 8½ |
| No. 7. Teasdale | 5½ | 8½ |
| No. 8. Walker, "Anglo-Colonial" | 5½ | 7½ |

As a result of the trials of the machines in Class I., the First Prize was awarded to Messrs. Francis Walker & Sons, Tithby, Bingham, Notts., for their 13-row Corn and Seed Drill "Anglo-Colonial," and the Second Prize was also awarded to Messrs. Francis Walker & Sons for their 12-row Corn and Seed Drill. Messrs. Kell & Co., Ltd., of Gloucester, were Highly Commended for their 13-row, or Lever Drill, "John Bull."

CLASS II.—DRILLS FOR GRASS AND CLOVER, COULTER AND BROADCAST.

There was only one entry in this class, viz., that of Messrs. F. Walker & Sons, of Tithby, Nottinghamshire.

This implement is adapted for sowing clover seed and also the lighter grass seeds, either mixed together or separately. The seeds can be drilled in "rows" or scattered broadcast.

It is somewhat of the Suffolk type of drill, 8 ft. in width to centre of wheel track, and sows twenty-six rows and is cup fed. The weight is 7¼ cwt. and the price 25*l.* 10*s.*

It was set to work upon the plots sown with barley by the machines entered in Class I., first drilling mixed clover, rye-grass, and other usual "layer and grass seeds." The drilling was performed quite satisfactorily, the coulter worked evenly and deposited the seeds in due proportion at the depth required.

"Broadcasting" was effected by raising the coulter by one lever about 3 in. above the ground, when the seeds travelled down the seed conductors and fell upon the surface of the land

from the lowest possible height, and is thereby less affected by side winds than when "broadcasted" by hand or with seed barrows and similar appliances.

To examine the distribution of the seed more closely, it was set to work over a piece of ground which had been levelled to a smooth surface and the seeds broadcasted over it. A careful inspection showed that the drill was accomplishing what was claimed for it, viz., that the light and heavy seeds were being distributed in proper proportions, and also that the mixed seeds were spread evenly over the entire surface. It is claimed that twenty-five acres can be drilled in one day.

The Judges were of opinion that the machine was fully worthy of the First Prize, notwithstanding that it unfortunately had no competition to face, and they accordingly awarded Messrs. Walker & Sons the First Prize of 10*l*.

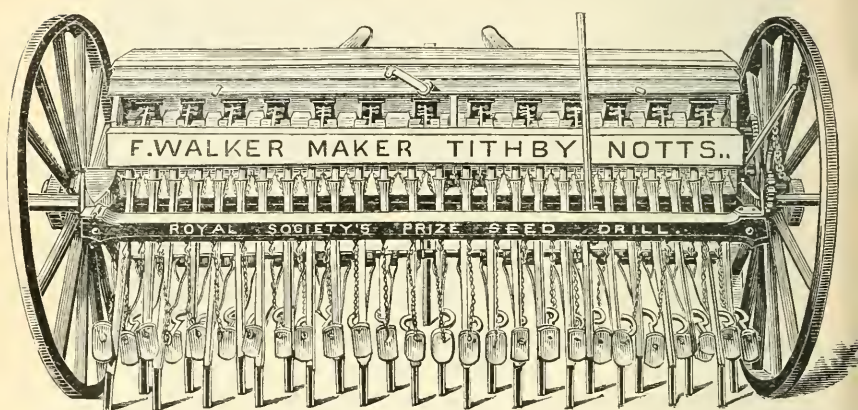


FIG. 4.—F. Walker & Sons' First Prize Coulter and Broadcast Drill for Grass and Clover, Class II.

It is a noteworthy fact that Messrs. Walker carried off prizes at the trials in 1874, and they are to be congratulated in holding their own in the present trials by winning three out of the four prizes offered.

The Judges do not think it necessary to laden this report with a detailed description of the various drills. These are obtainable in the descriptive catalogues, which the makers would no doubt gladly send to any enquirers.

But they cannot conclude without again expressing their regret that many other well-known makers did not enter their machines. It would have added much to the interest and value of the competition. Those entered were much of the same type, and it rather looked as though makers had devoted their energies towards cutting down the labour of man and

horse—a very laudable object. All the machines were drawn by two horses and one man only was employed. It is true that the work done was, in most instances, highly satisfactory, and left little to be desired, but the conditions under which the trials were conducted were *ideal*—land clean and level—soil in fine order and easily worked—weather perfect!

It is not always that such conditions prevail, and it is a question whether the economy in horses and men now demonstrated could be successfully practised under less favourable surroundings. After all, the prime cost of drilling is not the only consideration. Corn drilled straight and spaced regularly is less costly in the after operations of weeding than when the reverse is the case, and it is still a question whether some form of steerage (which of course adds to the cost of the machine and also labour somewhat) can with advantage and economy in the long run be always dispensed with. Another point which the trials brought out is that for drilling seeds of various weights and sizes, the old-fashioned “cup feed” still easily holds its own.

The Judges wish to express their thanks to the Stewards, Mr. F. S. W. Cornwallis and the Hon. John E. Cross, for the admirable way in which all the necessary arrangements for the conduct of the trials were made; to Mr. F. S. Courtney, C.E., the Consulting Engineer of the Society, for his valuable assistance and advice on important technical matters; to Mr. McRow, the courteous Secretary of the Society, whose tact and forethought contributed much to the smoothness and success of the trials; and lastly to Mr. C. D. Nicholson, the occupier of the land, who so generously placed his farm at the disposal of the Society, and also lent a willing, helping hand by freely loaning horses, men, and providing the seed. Mr. Nicholson extended a hearty Yorkshire hospitality to officials, competitors and visitors alike, and his cordial co-operation throughout the trials was invaluable.

CHAS. P. HALL.

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Woburn, Beds.

NOTES, COMMUNICATIONS, AND REVIEWS.

The Report of the Departmental Committee on Buildings for Small Holdings.—In the early part of the year, the President of the Board of Agriculture appointed a Committee to inquire into the equipment of Small Holdings, and the Committee's Report affords much interesting and valuable reading, alike for landlord and tenant. In many places the question of the success or failure of the Small Holdings created under the Act of 1907 is almost entirely one of the cost of the necessary buildings. Given land let in large farms at a certain rental per acre, will it carry the additional burden of interest on the outlay on houses and buildings when split up into small holdings? Whilst, however, the Report of the Committee deals with the most economical methods of planning and construction for this special purpose, its application will be found to be much more general than its title suggests, particularly in those sections which deal with dwelling-houses.

In pursuing their investigations the Committee visited many places in England and Wales, whilst a Sub-Committee also spent a few days in Sweden. The Report is divided into the following sections :—

1. The Small Holder's House.
2. Farm Buildings.
3. Unusual Materials and Methods of Construction.
4. Building By-laws.
5. Rural Labourers' Cottages.

Dealing with the Small Holder's House, the Committee give a list of minimum dimensions for every room and all the usual offices. As these houses are really nothing more than labourers' cottages, with certain necessary adjuncts, such as dairies, &c., the conclusions contained in the Report will repay careful study by all those interested in the rural housing question. Each room, or office, is dealt with separately, and its aspect, position of doors, windows, fireplaces and other fittings are discussed in the greatest detail. For example, reference is made to the discomfort and the unhealthiness of a house filled with steam on washing days, owing to the presence of the copper in the scullery or the back-kitchen, and attention is drawn to the fact that nowadays steam-consuming coppers are to be bought. At the same time, the Committee urge the advantage of a washhouse completely separated from the house, which can be made large enough to accommodate the perambulator, the garden tools, and such like things for which there is no place in the average cottage.

The vexed question of the parlour once more comes in for discussion, and the Committee arrive, apparently with some reluctance, at the conclusion that for labourers' cottages, and for farms not exceeding twenty-five acres, the extra expense in construction which the provision of this room entails, is not justifiable, although the desire for it on the part of the occupants is recognised. Many people will find it difficult to accept this conclusion. The parlour is not merely the useless depository for wax flowers and stuffed animals that many allege it to be. The desire for it is the outward evidence of an unexpressed longing for more refinement of life and better conditions generally, and surely this should be encouraged at all costs and not stifled. Moreover, the parlour is useful for many practical purposes; it is available for the reception of visitors; it can serve, on occasion, as an extra bedroom; and when death has laid his hand upon some member of the family, the parlour will afford a temporary resting-place for the remains—a very real boon where families are large and houses small. The writer has noticed constantly that where one living-room is the only accommodation which the house affords, the family will convert it into the parlour, whilst they crowd themselves uncomfortably into the scullery, or back-kitchen, for meals, &c., and many of those whose work brings them daily in contact with the labouring classes must have noticed a growing tendency in this direction. A room of the smallest possible dimensions is all that is wanted, and whenever possible it should most certainly be provided.

Coming to the question of construction, the Committee deal with every point with the same attention to detail already noted. It is pointed out that 9 in. solid walls are rarely weather-proof in the country unless coated with rough-cast; better still, 11 in. cavity walls should be specified. Attention is drawn to the advantage of overhanging eaves, both in appearance and in the protection afforded to the walls. Roof coverings, floors, window details, all are fully discussed, and the Committee point to the desirability of adhering as far as possible to local building materials, so that, for example, the eye may not be offended by a roof of thin blue Welsh slates arising in the midst of houses covered with pantiles. All will agree, too, with the remark that there is no justification for cramped, narrow, villa-fronts in country districts where economy of space is by no means the first consideration.

As to the use of special materials to effect economies, attention is drawn to the difficulty of generalising, owing to the wide fluctuations in the cost of various materials, and the recent advances in the prices of timber and of cement are instanced. The Committee also point out that there are certain

local methods of construction which, though interesting and valuable, are not capable of much extension, sometimes because the material utilised is more or less local, but more often because the necessary manipulative skill required is even more local than the material. As an instance, the chalk-walled cottages of Winterslow, near Salisbury, are mentioned, and the Essex clay-lump cottages, though not mentioned in the Report, furnish another example. The Committee are inclined to advocate concrete construction, either re-inforced or in blocks, but in either case it must be remembered that unless several houses are to be built, the outlay on machines, moulds, or forms makes concrete anything but a cheap construction. Special reference is made to the saving to be effected by building flat roofs of re-inforced concrete. The writer recently witnessed the construction of such a roof on a three-bedroomed cottage. It was composed of 4 in. of concrete, re-inforced with ordinary barbed wire at 6 in. intervals. The cost represented an advantage of 25 per cent. over an ordinary tiled roof, and an actual saving in money of 10%.

Building by-laws come, of course, under consideration, but the Committee recognise the fact that they are framed not to harass the landlord anxious to execute improvements, but to defeat the machinations of the jerry-builder. They express a desire, however, for greater elasticity in the interpretation of them, so that special cases might more easily be met.

As regards farm buildings, this section of the Committee's Report is of less general interest, and need not be examined here in great detail. The Committee advocate very strongly a timber construction, and in several directions they advise a breaking away from conventional design, in order to effect economies. It is not an uncommon thing on County Council holdings to see a cow-shed for four or six cows constructed in 9 in. brickwork, with feeding passage, &c., and the Committee rightly maintain that however good the theory may be, the practice of such construction cannot be justified.

The evidence of certain witnesses examined by the Committee is printed, and that of Mr. Swaine, of York, is of especial interest, as he has made a study of re-inforced concrete construction as applied to cottages, and his mention of a house built by himself at a total cost of 80*l.* leads one to hope much from this material. A series of model plans of houses and buildings of various sizes, designed to suit varying requirements are appended, and the whole Report will well repay the most careful study by those concerned in the provision of houses and buildings for small farmers and rural labourers.

“English Farming, Past and Present.”—By Rowland E. Prothero.—This book is based on Mr. Prothero’s earlier history of English Agriculture, *The Pioneers and Progress of English Farming*, published in 1888. Like its predecessor, but in much greater detail, the present work traces the development of agriculture from the old English manor, the communal village-farm of the thirteenth century, which may be considered the beginning of agriculture proper, as distinguished from a mere nomadic existence, through the alternations of progress and decay, prosperity and distress, to the present time—a time when, as many people think, we are threatened with far-reaching changes in the whole relation of the people to the land. Thus a wide and broad-minded view of the past, which has produced the present conditions, is now especially opportune. There is probably no other living writer who could combine so happily the qualities of historian and practical agriculturist. Mr. Prothero has the imagination and knowledge to reconstruct for us pictures of a long-forgotten countryside, of manorial village and open field-farm, and at the same time the closing pages show that he is entirely in touch with all the modern developments of scientific farming. He refutes his own motto from Jethro Tull, “Writing and Ploughing are two different talents.”

It is impossible in a short notice to do justice to the enormous amount of hard work which has been put into this book. Naturally the tale of the great rise in agriculture from 1700 to 1874 occupies relatively most space, and the headings of some of the chapters show in what detail this period is treated—Jethro Tull and Lord Townsend, 1700-1760—The Stock-breeders’ Art and Robert Bakewell, 1725-1795—The English Corn Laws—Highways—Tithes, are only some of them. In such a mass of detail a few slips are bound to crop up, but surely both the old Wiltshire and the old Herefordshire herds of sheep are wrongly described as black-faced! The old Wiltshire still used largely in the Midlands for crossing, and now known as “Westerns,” is a white-faced horned breed, and is not the modern Ryeland, white-faced and hornless, the ancestor of the old Herefordshire breed which made “Lemster Ore” famous.

These are, however, merely details. Perhaps the most useful lesson the book teaches is how entirely inter-dependent manufacture and agriculture, the town and the country, have always been. Till the middle of the eighteenth century a great part of England was still farmed on the “open-field” system, a development of the old “village manor” farms, when the arable land was tilled in separate strips by a number of occupiers, and the pasture-land was common “stinted” in proportion to the acreage of arable land held by each tenant. The

system had survived, in spite of the large enclosures of Tudor times, during which tillage gave place to pasture to supply the large export trade in wool, because it was sufficient for the needs of the country. But with the growth of a large industrial population, the old methods could no longer cope with the growing demand for food from a people still wholly dependent on a home-grown supply. Thus the pioneers of improved methods were greatly aided by the pressure of economic conditions. The one object was to make the land produce more, and to that end all obstacles had to be swept away—tithes were commuted, commons and open fields enclosed to allow of the growth of winter stock-food, long leases and every other incitement to improved methods allowed.

We are apt to think only of the distress that high prices entailed, but to them we owe the supremacy of English agriculture. The system of large farms occupied by men of large capital was forced upon the country by sheer necessity, and if ever England must feed herself again she will not get her corn and meat from small holdings. But now conditions are entirely changed, the problem is to keep the people on the land, not to make the land keep the people. Mr. Prothero suggests an increase of small ownerships, and with that a return to the old system of commons, as a means to making village life more attractive to the labourer. There is much to be said for it socially, but from the point of view of "Practice with Science," this must be a retrograde step. Small holdings must be only steps to large farms if we are to maintain the supremacy of our flocks and herds.

W. E. G. A.

Farming Results during the last Two Decades.—The opening address of the President of the Surveyors' Institution, the Hon. Edward Strutt, delivered in November last, is of more than ordinary interest to the agriculturist, dealing as it does with the results of farming operations on a considerable scale during the past eighteen years. Mr. Strutt is a firm believer in English farming, though not unnaturally he would like to vary the conditions under which agriculture is carried on, in certain directions. Especially does he regret the laying down of land to grass, with the consequent depopulation of rural districts, and some figures which he gives seem to indicate that the well-known preference which prevails amongst farmers for farms with a large proportion of grass rests on no very sure foundation. The farms to which Mr. Strutt's figures relate are situated in Essex, and extend to about 2,000 acres. Careful field accounts have been kept since the year 1894, and whilst the net annual profit on the arable land has been no less than

2*l.* 1*s.* 7*d.* per acre, the grass land during the same period has shown a profit of 7*s.* 11*d.* per acre only. The prejudice that exists to-day in favour of grass-land arose, of course, during the agricultural depression, when everything which tended to minimise expense was welcomed, and owing to the complete lack of anything approaching accurate accountancy in farming, the effect of the altered conditions of to-day are not fully appreciated.

Mr. Strutt's accounts call for very close study, and they are stated with great detail and completeness, so that it is possible to arrive at the profits for any given period. Thus, whilst the results for the past eighteen years are as just stated, the profits during the last six years are even more strikingly in favour of plough land, for the accounts show an average credit balance of 2*l.* 14*s.* 9*d.* per acre on arable land, and only 6*s.* 6*d.* per acre on grass land.

The profits, or losses, on every individual crop and on all classes of live stock appear, and with regard to the latter, it is interesting to note that only the cows and the poultry have shown a profit throughout the whole period of eighteen years. Cattle, sheep, and pigs all show a loss, though the cattle and pigs have been profitable during the past six years.

Mr. Strutt's paper, which can be obtained from the Secretary of the Surveyors' Institution, is deserving of the closest examination, and it is to be hoped that the example set by him in careful accountancy may find many imitators, so that more data may be available in the future as to the condition of the agricultural industry.

C. S. O.

The effect of Foot-and-Mouth Disease on the Milk Trade of Lancashire.—A great deal has been written on the hardships incurred by feeders through the prevalence of foot-and-mouth disease in Ireland, but little has been said of the consternation among the milk producers of this county, caused by the embargo on Irish cattle.

Lancashire, as probably all the readers of this note are aware, is one of the largest milk producing counties in the kingdom. This is due to the densely populated districts of south and south-east Lancashire that have to be catered for. The dairy farming of the county may be divided into three classes. The first is to be found close to any town. Here the farmer produces milk and sells it in the town. He seldom sells it to a dealer but "kits" milk, which is the local term for retailing it. This class of farm is worked purely to produce milk, and nothing is kept except cows in milk. No calves are reared and the cows, as soon as dry, are sold as "lying

off" to go to outlying farms. They are seldom milked for more than one "note" as one period of milking is called.

The second class is very similar, comprising as it does those farms not near a town but within easy reach of a railway. The farmer sells his milk wholesale to dealers in the towns. The method of working such farms is generally very much the same as those in the first class, though in some instances calves are reared.

The third class is confined to districts not within easy reach of the railway. This class consists of cheese making, butter making, and stock rearing. In many of these outlying districts farmers buy the "lying-off" cows from the milk-sellers and keep them till they calve, when they are sold back to the milk-sellers. It is the two first classes that have suffered from the closing of the ports against Irish cattle. It is apparent that from its geographical position Lancashire is the natural outlet for Ireland's large consignments of cattle, and every week numbers of new-calved and springing Irish cows are sold in the Lancashire markets. It is from these that the milk-seller largely draws his supplies. When the restrictions were first put on, prices for milk-cows naturally rose, but not to a very great extent, as there were a considerable number of new-calved cows (English) on the market. Then came an outbreak in South-East Lancashire which affected a large district; prices remained normal, or even dropped, as no cows could be moved into this area. But when the restrictions were taken off there was a rush for milk. Prices ruled high till fresh outbreaks were reported near Blackburn and Preston, and these outbreaks again lowered prices, for the reason just stated. As soon as these districts were no longer scheduled the markets were crowded out with buyers, with the result that cows which had any milk about them at all have reached a figure that is the highest on record.

The prospects before the milk-seller are not encouraging. He has to choose between two evils; either to buy cows at a price which, by a large amount, they will never fetch again, or else to lose customers. The latter course cannot be followed by the second class of farmer, as he has to keep up his contract which he very likely entered into before foot-and-mouth disease appeared.

The outsider would naturally say that the price of milk should rise. In some towns it has risen, but there are still some populous centres where it remains at the same rate at which it has been for years. This is, of course, to a large extent in the hands of the farmers, but when so many individuals are selling in one town the difficulty of bringing about any sort of combination or understanding among them is very

great, particularly as so many of them are working under yearly contracts.

The third class of farmer has in the meanwhile had an exceptionally good year. He has no milk-round or contract to keep up, whilst his new-calved cows, when sold, have fetched enormous prices.

The farmer, too, who goes in for "lying-off" cows has come out very much better than he ever appeared likely to do, as this class of cow was fetching a high price in the early part of the summer. The Lancashire milk-seller is hoping for the removal of the restrictions against Irish cattle, but he is the last man to want Irish cattle brought into England without proper precautions being taken to ensure that fresh infection in his county should be impossible.

W. R. P.

The Agricultural Organisation Society.—In order to qualify for grants from the Development Fund, the Agricultural Organisation Society has now been reconstituted to meet certain conditions laid down by the Board of Agriculture and Fisheries and the Development Commission with the approval of the Treasury.

Under the said conditions the work of agricultural organisation on co-operative lines is to be continued, but on a more comprehensive scale. The first Governors, who hold office until April, 1914, have been appointed by the Board of Agriculture and Fisheries and the Development Commission jointly, and in addition to representatives of the old Society's governing body, include representatives of important agricultural interests and other public bodies, *e.g.* the Board of Agriculture, the County Councils Association, the Co-operative Union, Railway Companies, the County Land Agents Association, &c. Mr. R. A. Yerburch, M.P., whose work on behalf of the old Society is so well known and recognised, has been appointed the first President, and the Earl of Shaftesbury, K.P., K.C.V.O., the Chairman of the Governors. The remaining Governors are the Lord Strachie, Mr. F. D. Acland, M.P., Mr. Charles Bathurst, M.P., Mr. S. Bostock, Mr. W. Fitzherbert-Brockholes, D.L., Mr. Philip Burt, Mr. E. J. Cheney, Mr. H. C. Fairfax-Cholmeley, Mr. J. S. Corbett, Mr. Rupert Ellis, Mr. H. Jones-Davies, J.P., Mr. Cyprian Knollys, Mr. Duncan McInnes, J.P., Mr. G. L. Pain, Mr. Abel H. Smith, Mr. Clement Smith, The Hon. Edward Strutt, Mr. A. Whitehead, Colonel Robert Williams, M.P., Mrs. Roland Wilkins, and Sir James Wilson, K.C.S.I.

The first meeting of the Governors took place on October 9 last at the Westminster Palace Hotel, Westminster, S.W.

SIR CHARLES WHITEHEAD.

DURING the year the Society has suffered the loss of three Members who served it on its Council, and in many other ways.

Sir Charles Whitehead, who was born in 1834, was a native of Kent, and was educated at Tonbridge School. Considerations of health decided his parents to have him trained in agriculture, and he spent some time with the late Mr. Elias Squarey, in Wiltshire. Subsequently he farmed in Kent for many years, and at the same time he devoted himself to administrative work of all kinds; but in 1880, owing to the pressure of county and other public engagements, he finally gave up farming.

Sir Charles contributed many articles, principally on hop and fruit-growing, and on insect pests, to the *Journal of the Royal Agricultural Society* and to the agricultural press generally. He was a member of the Royal Commission on Agricultural Depression, and he conducted many investigations of plant diseases for the Committee of Council for Agriculture, being ultimately appointed Agricultural Adviser to that body. On the appointment of the Board of Agriculture, he continued in this office with the title of Technical Adviser. Sir Charles joined the Royal Agricultural Society in the year 1857, and in 1866 he was elected a Member of Council, representing his native county. He served on the Council for thirty-seven years, during which he acted upon the Journal, Chemical, Botanical and Zoological Committees, and officiated both as Steward and Judge at the annual shows on many occasions. In the year 1889 he was elected a Governor of the Society.

Sir Charles Whitehead married, in 1865, Catherine Letitia, daughter of the late Mr. R. C. P. Balston, of Thornhills, Maidstone. His wife predeceased him in 1896, and Sir Charles himself died suddenly on the 29th November last.

HENRY DUDDING.

Mr. Henry Dudding was the last representative of a family noted as agriculturists in Lincolnshire, for upwards of two hundred years. He was born at Panton, in Lincolnshire, in April, 1834, and was the son of Richard Dudding, who occupied a very considerable holding on the Turnor estate, as his father had done before him. In the early eighties, after the death of his father, Mr. Dudding moved to Riby, and occupied farms there under Capt. Pretyma, and Lord Yarborough, up to the time of his death. His forebears had always been noted breeders of pedigree stock, but at Riby, Mr. Dudding greatly enhanced the family reputation by his phenomenal success with Lincolnshire Long-wool sheep, and with Shorthorn cattle. Buyers would come from all parts of the world to his annual sales, and in the capacity of Judge, he himself travelled far and wide. He was an exhibitor on a large scale, and in the year 1906 his shearling ram, champion at the Derby Royal Show, was sold for the record price of 1,450 guineas. Mr. Dudding was a man of wide interests, and was actively concerned in the management of many Agricultural and Breed Societies. In politics he was a Conservative, but he took no active part in political work. He joined the Royal Agricultural Society in the year 1870, and was elected a Member of Council, representing his native county, in 1906. Mr. Dudding was never married, and his death, a few days after an operation, occurred on the 8th December last.

GEORGE TAYLOR.

Another noted Shorthorn breeder has been removed by the death of Mr. George Taylor, who passed away, after a painful and protracted illness, on August 26, 1912. Mr. Taylor was born on January 15, 1852, at Stanton Prior, Somersetshire—the home of his father and grandfather. Here he established his celebrated herd of Bates Shorthorns in the year 1878 by purchasing three of the best cows at the sale of Mr. Thomas Harris, of Bromsgrove. The herd was removed to Cranford Park in the year 1891. From its foundation careful records were kept, and these show that the production of animals

combining heavy yields with high breeding was the result of Mr. Taylor's efforts.

He joined the Royal Agricultural Society in 1879, and in the year 1905 was elected to a seat on the Council as the representative of the division of Middlesex. He served on two of the Society's important Committees—the Stock Prizes and the Showyard Works, at the monthly meetings of which he displayed his keen knowledge of business. Mr. Taylor was also associated with many other bodies connected with agriculture, and in 1911 was President of the Shorthorn Society.

He always took an active part in public affairs, and for many years was Chairman of the Keynsham Highway Board, being invited to become their first representative on the County Council—an honour he had to decline on account of his leaving the district for Cranford. In 1910 he was elected a county councillor for the Middlesex division.

Mr. Taylor was a public spirited man and a sportsman, with the reputation of being as good a judge of a horse and hound as of a Shorthorn.

Royal Agricultural Society of England.

(Established May 9th, 1838, as the ENGLISH AGRICULTURAL SOCIETY, and incorporated by Royal Charter on March 26th, 1840).

Patron.

HIS MOST GRACIOUS MAJESTY THE KING.

President for 1913.

THE EARL OF NORTHBROOK.

Trustees.

Year when
elected on
Council.

| | |
|------|---|
| 1889 | H.R.H. PRINCE CHRISTIAN, K.G., <i>Cumberland Lodge, Windsor.</i> |
| 1895 | BEDFORD, Duke of, K.G., <i>Woburn Abbey, Bedfordshire.</i> |
| 1871 | BOWEN-JONES, Sir J. B., Bart., <i>Council House Court, Shrewsbury.</i> |
| 1893 | CORNWALLIS, F. S. W., <i>Linton Park, Maidstone, Kent.</i> |
| 1885 | COVENTRY, Earl of, <i>Croome Court, Serern Stoke, Worcestershire.</i> |
| 1898 | DEVONSHIRE, Duke of, G.C.V.O., <i>Chatsworth, Chesterfield.</i> |
| 1881 | GILBEY, Sir WALTER, Bart., <i>Elsenham Hall, Elsenham, Essex.</i> |
| 1883 | JERSEY, Earl of, G.C.B., G.C.M.G., <i>Middleton Park, Bicester, Ocon.</i> |
| 1899 | MIDDLETON, Lord, <i>Birdsall House, Malton, Yorks.</i> |
| 1880 | MORETON, Lord, <i>Sarsden House, Chipping Norton, Oxon.</i> |
| 1899 | NORTHBROOK, Earl of, <i>Stratton, Micheldever, Hampshire.</i> |
| 1881 | THOROLD, Sir JOHN H., Bart., <i>Old Hall, Syston, Grantham.</i> |

Vice-Presidents.

| | |
|------|--|
| 1905 | ADEANE, C. R. W., <i>Babraham Hall, Cambridge.</i> |
| 1905 | COOPER, Sir RICHARD P., Bart., <i>Shenstone Court, Lichfield.</i> |
| 1887 | CRUTCHLEY, PERCY, <i>Sunninghill Lodge, Ascot, Berkshire.</i> |
| 1908 | DERBY, Earl of, G.C.V.O., C.B., <i>Knowsley, Prescott, Lancashire.</i> |
| 1891 | DUGDALE, J. MARSHALL, <i>Llwyn, Llanfyllin S.O., Mont.</i> |
| 1903 | FELLOWES, Rt. Hon. Sir AILWYN E., K.C.V.O., <i>Honingham, Norwich.</i> |
| 1876 | FEVERSHAM, Earl of, <i>Duncombe Park, Helmsley, Yorkshire.</i> |
| 1900 | GREAVES, R. M., <i>Wern, Portmadoc, North Wales.</i> |
| 1904 | GREENALL, Sir GILBERT, Bart., C.V.O., <i>Walton Hall, Warrington.</i> |
| 1908 | NORTHUMBERLAND, Duke of, K.G., <i>Alnwick Castle, Northumberland.</i> |
| 1881 | PARKER, Hon. CECIL T., <i>The Grove, Corsham, Wiltshire.</i> |
| 1907 | YARBOROUGH, Earl of, <i>Brocklesby Park, Lincolnshire.</i> |

Ordinary Members of the Council.

| | |
|------|---|
| 1910 | ALEXANDER, D. T., <i>Bryneithen, Dinas Powis (Glamorganshire).</i> |
| 1905 | AVELING, THOMAS L., <i>Boley Hill House, Rochester (Kent).</i> |
| 1911 | BEHRENS, Capt. CLIVE, <i>Swinton Grange, Malton (Yorks., N. Riding).</i> |
| 1911 | BETTS, E. W., <i>Babingley, King's Lynn (Norfolk).</i> |
| 1906 | BROCKLEHURST, HENRY DENT, <i>Sudeley Castle, Winchcombe (Glos.).</i> |
| 1909 | BROCKLEHURST, Maj.-Gen. J. F., C.V.O., C.B., <i>Ranksborough, Ockham (Rutland).</i> |
| 1910 | BROWN, DAVIS, <i>Marham Hall, Downham Market (Norfolk).</i> |
| 1906 | BUTTAR, THOMAS A., <i>Corston, Coupar Angus (Scotland).</i> |
| 1905 | CARDEN, RICHARD GEORGE, <i>Fishmoynce, Templemore, Co. Tipperary (Ireland).</i> |

Ordinary Members of the Council (*continued*).Year when
first elected
on Council

- 1905 CARR, RICHARDSON, *Estate Office, Tring Park (Hertfordshire)*.
 1909 CROSS, HON. JOHN E., *High Legh, Knutsford (Cheshire)*.
 1905 EADIE, JOHN T. C., *The Rock, Newton Solney, Burton-on-Trent (Derbyshire)*.
 1911 EVANS, ARTHUR E., *Bronwylyfa, Wrexham (North Wales)*.
 1913 EVENS, JOHN, *Burton, Lincoln (Lincolnshire)*.
 1905 FALCONER, JAMES, *Northbrook Farm, Micheldever Station (Hampshire)*.
 1907 FRANK, HOWARD, *20 Hanover Square, W. (London)*.
 1909 GARNE, W. T., *Aldsworth, Northleach (Gloucestershire)*.
 1906 GLOVER, JAMES W., *Beechwood, Warwick (Warwickshire)*.
 1907 HAMLYN, ERNEST A., *Oakdale, Ockley (Surrey)*.
 1910 HARLECH, Lord, *Broggyntyn, Oswestry (Shropshire)*.
 1905 HARRIS, JOSEPH, *Brackenbrough Tower, Carlisle (Cumberland)*.
 1903 HARRISON, WILLIAM, *Hall House, Leigh (Lancashire)*.
 1911 HASTINGS, Lord, *Melton Constable Park (Norfolk)*.
 1909 HAZLERIGG, Sir ARTHUR G., Bart., *Noseley Hall (Leicestershire)*.
 1910 HENDERSON, Major H. G., M.P., *Kitemore, Faringdon (Berkshire)*.
 1905 HINE, JOHN HENRY, *Pomphlett Farm, Plymstock, Plymouth (Devon)*.
 1905 HISCOCK, ARTHUR, *Manor Farm, Motcombe, Shaftesbury (Dorset)*.
 1903 HOBBS, ROBERT W., *Kelmscott, Lechlade (Oxfordshire)*.
 1908 HOSKEN, W. J., *Pulsack, Hayle (Cornwall)*.
 1900 HOWARD, JOHN HOWARD, *Clapham Park, near Bedford (Bedfordshire)*.
 1905 INGRAM, WALTER F., *2 St. Andrew's Place, Lewes (Sussex)*.
 1905 KNIGHTLEY, Sir CHARLES V., Bart., *Fawsley, Daventry (Northants)*.
 1912 LANE-FOX, GEORGE R., M.P., *Bramham Park, Boston Spa (Yorks. W.R.)*.
 1909 LUDDINGTON, J. L., *Littleport, Ely (Cambridgeshire)*.
 1909 MANSELL, ALFRED, *College Hill, Shrewsbury (Shropshire)*.
 1904 MATHEWS, ERNEST, *Little Shardeloes, Amersham (Buckinghamshire)*.
 1905 MAY, WILLIAM A., *3 Wellington Street, Strand, W.C. (London)*.
 1904 MIDDLETON, CHRISTOPHER, *Vane Terrace, Darlington (Durham)*.
 1910 MIDWOOD, G. NORRIS, *The Grange, North Rode, Congleton (Cheshire)*.
 1884 MILLER, T. HORROCKS, *Singleton Park, Poulton-le-Fylde (Lancashire)*.
 1911 MYATT, JOHN, *Lynn House, Lichfield (Staffordshire)*.
 1907 NOCTON, WILLIAM, *Langham Hall, Colchester (Essex)*.
 1910 OVERMAN, HENRY, *Weasenham, Swaffham (Norfolk)*.
 1909 PATTERSON, R. G., *Acton Hill, Stafford (Staffordshire)*.
 1912 PERKIN, A. W., *Greenford Green, Harrow (Middlesex)*.
 1905 PILKINGTON, CLAUDE M. S., *Wollaton, Nottingham (Nottinghamshire)*.
 1906 PLUMPTRE, H. FITZWALTER, *Goodnestone, near Canterbury (Kent)*.
 1909 PROUT, W. A., *Sawbridgeworth, Herts. (London)*.
 1905 REA, GEORGE GREY, *Middleton, Wooler (Northumberland)*.
 1897 REYNARD, FREDERICK, *Sunderlandwick, Driffield (Yorks., E. Riding)*.
 1905 RICHMOND AND GORDON, Duke of, K.G., *Goodwood, Chichester (Sussex)*.
 1908 RIDLEY, Viscount, *Blagdon, Cramlington (Northumberland)*.
 1897 ROGERS, C. COLTMAN, *Stanage Park, Brampton Bryan (South Wales)*.
 1905 ROWELL, JOHN, *Bury, Huntingdon (Huntingdonshire)*.
 1907 SMITH, FRED, *Deben Haugh, Woodbridge (Suffolk)*.
 1905 SMITH, HENRY HERBERT, *Bowood, Calne (Wiltshire)*.
 1891 STANFORTH, E. WILFRID, *Kirk Hammerton Hall, York (Yorks., W.R.)*.
 1912 STRACHIE, Lord, *Sutton Court, Pensford (Somerset)*.
 1907 TINDALL, C. W., *Wainfleet, S.O. (Lincolnshire)*.
 1904 TURNER, ARTHUR P., *The Leen, Pembroke (Herefordshire)*.
 1889 WHEELER, E. VINCENT V., *Newnham Court, Tenbury (Worcestershire)*.
 1889 WILSON, CHRISTOPHER W., *Rigmaden Park, Kirkby Lonsdale (Westmorland)*.
 1908 WRIGLEY, LOUIS C., *Trelleck Grange, Chepstow (Monmouthshire)*.

STANDING COMMITTEES.

* * Under By-law 39, the PRESIDENT is a Member *ex officio* of all Committees, and the TRUSTEES and VICE-PRESIDENTS are Members *ex officio* of all Standing Committees except the Committee of Selection.

The Honorary Director is a Member ex officio of all Committees.

Finance Committee.

| | |
|---------------------------------------|----------------------|
| ADEANE, C. R. W. (<i>Chairman</i>). | AVELING, T. L. |
| DEVONSHIRE, Duke of. | CARR, RICHARDSON. |
| NORTHBROOK, Earl of. | CORNWALLIS, F. S. W. |
| FELLOWES, Rt. Hon. Sir A. E. | CRUTCHLEY, PERCY. |
| COOPER, Sir R. P., Bart. | HARRISON, W. |
| GREENALL, Sir G., Bart. | MATHEWS, ERNEST. |
| THOROLD, Sir J. H., Bart. | WHEELER, E. V. V. |

Journal and Education Committee.

| | | |
|--|-----------------------|-------------------|
| THOROLD, Sir J. H., Bart. (<i>Chairman</i>). | BROCKLEHURST, H. D. | MATHEWS, ERNEST. |
| HASTINGS, Lord. | CORNWALLIS, F. S. W. | MAY, W. A. |
| MORETON, Lord. | DUGDALE, J. MARSHALL. | PLUMPTRE, H. F. |
| BOWEN-JONES, Sir J. B., Bart. | LUDDINGTON, J. L. | SMITH, H. H. |
| ADEANE, C. R. W. | MANSELL, ALFRED. | WHEELER, E. V. V. |

Chemical and Woburn Committee.

| | | |
|--|----------------------|----------------------|
| BOWEN-JONES, Sir J. B., Bart. (<i>Chairman</i>). | GREAVES, R. M. | PATTERSON, R. G. |
| HARLECH, Lord. | HOSKEN, W. J. | PERKIN, A. W. |
| HASTINGS, Lord. | HOWARD, JOHN HOWARD. | PILKINGTON, C. M. S. |
| KNIGHTLEY, Sir C. V., Bart. | INGRAM, W. F. | PROUT, W. A. |
| BROCKLEHURST, H. D. | LUDDINGTON, J. L. | REYNARD, F. |
| BROCKLEHURST, Maj.-Gen. | MAY, W. A. | TINDALL, C. W. |
| FALCONER, J. | MIDDLETON, C. | TURNER, A. P. |
| | MIDWOOD, G. NORRIS | |

Botanical and Zoological Committee.

| | | |
|------------------------------------|---------------------------|-------------------|
| ROGERS, C. C. (<i>Chairman</i>). | THOROLD, Sir J. H., Bart. | MIDDLETON, C. |
| MORETON, Lord. | BROWN, DAVIS | PLUMPTRE, H. F. |
| STRACHIE, Lord. | CORNWALLIS, F. S. W. | PROUT, W. A. |
| BOWEN-JONES, Sir J. B., Bart. | LANE-FOX, G. R. | WHEELER, E. V. V. |
| HAZLERIGG, Sir A. G., Bart. | LUDDINGTON, J. L. | |

Veterinary Committee.

| | | |
|--|----------------------|---------------------|
| NORTHBROOK, Earl of (<i>Chairman</i>). | CARR, RICHARDSON. | *PRESIDENT OF ROYAL |
| STRACHIE, Lord. | CRUTCHLEY, PERCY. | COLLEGE OF VET. |
| FELLOWES, Rt. Hon. Sir A. E. | EADIE, J. T. C. | SURGEONS. |
| PARKER, Hon. C. T. | GARNE, W. T. | ROWELL, JOHN. |
| THOROLD, Sir J. H., Bart. | HARRIS, JOSEPH. | SMITH, FRED. |
| *MCFADYEAN, Prof. Sir J. | MANSELL, ALFRED | SMITH, H. H. |
| ADEANE, C. R. W. | *MASTER OF FARRIERS' | STANFORTH, E. W. |
| BEHRENS, Capt. CLIVE. | COMPANY. | SWITHINBANK, H. |
| BROWN, DAVIS. | MATHEWS, ERNEST. | WILSON, C. W. |
| | MILLER, T. H. | |

* *Professional Members of Veterinary Committee not Members of Council.*

Stock Prizes Committee.

| | | |
|----------------------------------|------------------------|-----------------|
| REYNARD, F. (<i>Chairman</i>). | CRUTCHLEY, PERCY. | MILLER, T. H. |
| COVENTRY, Earl of. | EADIE, J. T. C. | MYATT, JOHN. |
| NORTHBROOK, Earl of. | EVANS, ARTHUR E. | OVERMAN, HENRY. |
| HARLECH, Lord. | GARNE, W. T. | REA, G. G. |
| MIDDLETON, Lord. | GREAVES, R. M. | ROGERS, C. C. |
| BOWEN-JONES, Sir J. B., Bart. | HENDERSON, Major H. G. | ROWELL, JOHN. |
| COOPER, Sir R. P., Bart. | HINE, J. H. | SMITH, FRED. |
| GREENALL, Sir G., Bart. | HOBBS, ROBERT W. | TINDALL, C. W. |
| BEHRENS, Capt. CLIVE. | MANSELL, ALFRED. | TURNER, A. P. |
| BROWN, DAVIS. | MATHEWS, ERNEST. | WILSON, C. W. |
| BUTTAR, T. A. | MIDWOOD, G. NORRIS. | The Stewards of |
| CARR, RICHARDSON. | | Live Stock. |

Implement Committee.

| | | |
|-------------------------------------|----------------------|----------------------|
| GREAVES, R. M. (<i>Chairman</i>). | GLOVER, J. W. | PATTERSON, R. G. |
| CROSS, Hon. J. E. | HARRISON, W. | PILKINGTON, C. M. S. |
| BOWEN-JONES, Sir J. B., Bart. | HOWARD, JOHN HOWARD. | PROUT, W. A. |
| ALEXANDER, D. T. | LUDDINGTON, J. L. | STANYFORTH, E. W. |
| AVELING, T. L. | MIDDLETON, C. | WHEELER, E. V. V. |
| CRUTCHLEY, PERCY. | MYATT, JOHN. | The Stewards of |
| FALCONER, J. | | Implements. |

Showyard Works Committee.

| | | |
|--------------------------|-------------------|----------------------|
| GREENALL, Sir G., Bart. | AVELING, T. L. | OVERMAN, HENRY. |
| (<i>Chairman</i>). | CARR, RICHARDSON. | PILKINGTON, C. M. S. |
| CROSS, Hon. J. E. | CRUTCHLEY, PERCY. | REA, G. G. |
| COOPER, Sir R. P., Bart. | HARRISON, W. | REYNARD, F. |
| ALEXANDER, D. T. | HOWARD, J. H. | STANYFORTH, E. W. |
| | LANE-FOX, G. R. | |

Committee of Selection.

| | | |
|---------------------------|------------------------------|----------------------|
| THOROLD, Sir J. H., Bart. | FELLOWES, Rt. Hon. Sir A. E. | CORNWALLIS, F. S. W. |
| (<i>Chairman</i>). | COOPER, Sir R. P., Bart. | HARRIS, J. |
| THE PRESIDENT. | AVELING, T. L. | WHEELER, E. V. V. |

And the Chairman of each of the Standing Committees.

Dairy and Produce Committee.

| | | |
|---------------------------|------------------------|-------------------|
| MATHEWS, ERNEST | CARR, RICHARDSON. | HINE, J. H. |
| (<i>Chairman</i>). | CRUTCHLEY, PERCY. | OVERMAN, HENRY. |
| HASTINGS, Lord | DUGDALE, J. MARSHALL. | PLUMPTRE, H. F. |
| PARKER, Hon. C. T. | EVENS, JOHN. | SMITH, FRED. |
| THOROLD, Sir J. H., Bart. | GREAVES, R. M. | WHEELER, E. V. V. |
| BEHRENS, Capt. CLIVE. | HENDERSON, Major H. G. | |

Special Committee.

| | | |
|-------------------------------|----------------------|----------------------|
| DEVONSHIRE, Duke of | ADEANE, C. R. W. | MATHEWS, ERNEST. |
| (<i>Chairman</i>). | AVELING, T. L. | *NUTTALL, Prof. |
| NORTHBROOK, Earl of. | *BIFFEN, Prof. R. H. | REYNARD, F. |
| FELLOWES, Rt. Hon. Sir A. E. | CARR, RICHARDSON. | ROGERS, C. C. |
| BOWEN-JONES, Sir J. B., Bart. | *COOPER, W. F. | TINDALL, C. W. |
| COOPER, Sir R. P., Bart. | CORNWALLIS, F. S. W. | *VOELCKER, Dr. J. A. |
| GREENALL, Sir G., Bart. | CRUTCHLEY, PERCY. | *WARBURTON, C. |
| THOROLD, Sir J. H., Bart. | GREAVES, R. M. | WHEELER, E. V. V. |
| *MCFADYEAN, Prof. Sir J. | HARRISON, W. | *WOOD, Prof. T. B. |

* *Scientific Members of Special Committee not Members of Council.*

General Bristol Committee.

THE COUNCIL, with the following representatives of the LOCAL COMMITTEE:—

| | |
|----------------------------|-----------------------------------|
| THE LORD MAYOR OF BRISTOL. | HUMPHRIES, SIDNEY. |
| WILLS, Sir FRANK. | KIDNER, SAMUEL. |
| ADDIE, PETER. | PETER, JAMES. |
| BRIDGMAN, HENRY. | RISELEY, H. L. |
| CAVE, C. H. | TAYLOR, E. J., <i>Town Clerk.</i> |
| HARLE, J. J. | WALKER, ELDRED G. F. |
| HAYES, Alderman C. A. | WILLS, H. W. SECCOMBE. |

GEORGE NICHOLS, *Local Hon. Secretary.*

Honorary Director.—SIR GILBERT GREENALL, BART.

Secretary.—THOMAS McROW, 16 Bedford Square, W.C.

Editor of Journal.—C. S. ORWIN, *School of Rural Economy, Oxford.*

Consulting Chemist.—Dr. J. AUGUSTUS VOELCKER, M.A., F.I.C., 1 Tudor Street, London, E.C.

Consulting Veterinary Surgeon.—Prof. Sir JOHN MCFADYEAN, *Royal Veterinary College, Camden Town, N.W.*

Botanist.—Professor R. H. BIFFEN, M.A., *School of Agriculture, Cambridge.*

Zoologist.—CECIL WARBURTON, M.A., *School of Agriculture, Cambridge.*

Consulting Engineer.—F. S. COURTNEY, 25 Victoria Street, Westminster, S.W.

Surveyor—J. R. NAYLOR, F.R.I.B.A., *Smith's Bank Chambers, Derby.*

Consulting Surveyor.—GEORGE HUNT, *Eresham, Worcestershire.*

Publisher.—JOHN MURRAY, 50A Albemarle Street, W.

Solicitors.—GARRARD, WOLFE, GAZE & CLARKE, 13 Suffolk Street, S.W.

Bankers.—THE LONDON COUNTY AND WESTMINSTER BANK, *St. James's Square.*

DISTRIBUTION OF GOVERNORS AND MEMBERS OF THE SOCIETY, AND OF ORDINARY MEMBERS OF THE COUNCIL.

| ELECTORAL DISTRICT | DIVISION | NUMBER OF GOVERNORS AND MEMBERS | NUMBER OF ORDINARY MEMBERS OF COUNCIL | ORDINARY MEMBERS OF COUNCIL |
|-------------------------------------|---|---------------------------------|---------------------------------------|--|
| A. | BEDFORDSHIRE | 94 | 1 | J. H. Howard. |
| | CHESHIRE | 329 | 2 | Hon. J. E. Cross ; G. Norris Mid-wood. |
| | CORNWALL | 87 | 1 | W. J. Hosken. |
| | DERBYSHIRE | 144 | 1 | J. T. C. Eadie. |
| | DORSET | 85 | 1 | A. Hiscock. |
| | HAMPSHIRE AND CHANNEL ISLANDS | 235 | 1 | J. Falconer. |
| | HERTFORDSHIRE | 227 | 1 | Richardson Carr. |
| | LANCASHIRE AND ISLE OF MAN | 403 | 2 | W. Harrison ; T. H. Miller. |
| | MIDDLESEX | 105 | 1 | A. W. Perkin |
| | MONMOUTHSHIRE | 54 | 1 | L. C. Wrigley. |
| | NORFOLK | 657 | 4 | { E. W. Betts ; Davis Brown ; Lord Hastings ; Henry Overman. |
| | NORTHAMPTONSHIRE | 193 | 1 | Sir C. V. Knightley. |
| | NORTHUMBERLAND | 269 | 2 | G. G. Rea ; Viscount Ridley. |
| | STAFFORDSHIRE | 284 | 2 | John Myatt ; R. G. Patterson. |
| B. | WORCESTERSHIRE | 190 | 1 | E. V. V. Wheeler. |
| | YORKSHIRE, N.R. | 202 | 1 | Capt. Clive Behrens. |
| | SCOTLAND | 226 | 1 | T. A. Buttar. |
| | | —3,784 | —24 | |
| | BUCKINGHAMSHIRE | 150 | 1 | E. Mathews. |
| | DEVON | 161 | 1 | J. H. Hine. |
| | DURHAM | 136 | 1 | C. Middleton. |
| | ESSEX | 211 | 1 | W. Nocton. |
| | HEREFORDSHIRE | 142 | 1 | A. P. Turner. |
| | LEICESTERSHIRE | 193 | 1 | Sir A. G. Hazlerigg. |
| | LONDON | 576 | 3 | { Howard Frank ; W. A. May ; W. A. Prout. |
| | NOTTINGHAMSHIRE | 165 | 1 | C. M. S. Pilkington. |
| | RUTLAND | 28 | 1 | Maj.-Gen. J. F. Brocklehurst. |
| | SHROPSHIRE | 328 | 2 | Lord Harlech ; Alfred Mansell. |
| C. | SUFFOLK | 254 | 1 | Fred Smith. |
| | SURREY | 225 | 1 | E. A. Hamlyn. |
| | WILTSHIRE | 143 | 1 | H. H. Smith. |
| | YORKSHIRE, W.R. | 368 | 2 | G. R. Lane-Fox, M.P. ; E. W. Stanyforth. |
| | SOUTH WALES | 101 | 1 | C. C. Rogers. |
| | | —3,181 | —19 | |
| | BERKSHIRE | 184 | 1 | Major H. G. Henderson, M.P. |
| | CAMBRIDGESHIRE | 182 | 1 | J. L. Luddington. |
| | CUMBERLAND | 114 | 1 | Joseph Harris. |
| | GLAMORGAN | 84 | 1 | D. T. Alexander. |
| | GLOUCESTERSHIRE | 338 | 2 | H. D. Brocklehurst ; W. T. Garne. |
| | HUNTINGDONSHIRE | 47 | 1 | John Rowell. |
| | KENT | 365 | 2 | T. L. Aveling ; H. F. Plumptre. |
| | LINCOLNSHIRE | 353 | 2 | C. W. Tindall |
| | OXFORDSHIRE | 168 | 1 | R. W. Hobbs. |
| | SOMERSET | 123 | 1 | Lord Strachie. |
| | SUSSEX | 291 | 2 | { W. F. Ingram ; Duke of Richmond and Gordon. |
| | WARWICKSHIRE | 241 | 1 | J. W. Glover. |
| | WESTMORLAND | 58 | 1 | C. W. Wilson. |
| | YORKSHIRE, E.R. | 164 | 1 | F. Reynard. |
| | IRELAND | 123 | 1 | R. G. Carden. |
| | NORTH WALES | 181 | 1 | |
| | | —3,016 | —20 | |
| FOREIGN COUNTRIES | | 313 | | |
| MEMBERS WITH NO ADDRESSES | | 15 | | |
| GRAND TOTALS | | 10,309 | 63 | |

TABLE SHOWING THE NUMBER OF GOVERNORS AND MEMBERS
IN EACH YEAR FROM THE ESTABLISHMENT OF THE SOCIETY.

| Year ending with Show of | President of the Year | Governors | | Members | | | Total. |
|-----------------------------------|---|-----------|--------|---------|--------|---------------|--------|
| | | Life | Annual | Life | Annual | Honor- ary | |
| 1839 | 3rd Earl Spencer | — | — | — | — | — | 1,100 |
| 1840 | 5th Duke of Richmond | 86 | 189 | 146 | 2,434 | 5 | 2,860 |
| 1841 | Mr. Philip Pusey | 91 | 219 | 231 | 4,047 | 7 | 4,595 |
| 1842 | Mr. Henry Handley | 101 | 211 | 328 | 5,194 | 15 | 5,849 |
| 1843 | 4th Earl of Hardwicke | 94 | 209 | 429 | 6,155 | 15 | 6,902 |
| 1844 | 3rd Earl Spencer | 95 | 214 | 442 | 6,161 | 15 | 6,927 |
| 1845 | 5th Duke of Richmond | 94 | 198 | 527 | 5,899 | 15 | 6,733 |
| 1846 | 1st Viscount Portman | 92 | 201 | 554 | 6,105 | 19 | 6,971 |
| 1847 | 6th Earl of Egmont | 91 | 195 | 607 | 5,478 | 20 | 6,391 |
| 1848 | 2nd Earl of Yarborough | 93 | 186 | 648 | 5,387 | 21 | 6,335 |
| 1849 | 3rd Earl of Chichester | 89 | 178 | 582 | 4,643 | 20 | 5,512 |
| 1850 | 4th Marquis of Downshire | 90 | 169 | 627 | 4,356 | 19 | 5,261 |
| 1851 | 5th Duke of Richmond | 91 | 162 | 674 | 4,175 | 19 | 5,121 |
| 1852 | 2nd Earl of Ducie | 93 | 156 | 711 | 4,002 | 19 | 4,981 |
| 1853 | 2nd Lord Ashburton | 90 | 147 | 739 | 3,928 | 19 | 4,923 |
| 1854 | Mr. Philip Pusey | 88 | 146 | 771 | 4,152 | 20 | 5,177 |
| 1855 | Mr. William Miles, M.P. | 89 | 141 | 795 | 3,838 | 19 | 4,882 |
| 1856 | 1st Viscount Portman | 85 | 139 | 839 | 3,896 | 20 | 4,979 |
| 1857 | Viscount Ossington | 83 | 137 | 896 | 3,933 | 19 | 5,068 |
| 1858 | 6th Lord Berners | 81 | 133 | 904 | 4,010 | 18 | 5,146 |
| 1859 | 7th Duke of Marlborough | 78 | 130 | 927 | 4,008 | 18 | 5,161 |
| 1860 | 5th Lord Walsingham | 72 | 119 | 927 | 4,047 | 18 | 5,183 |
| 1861 | 4th Earl of Powis | 84 | 90 | 1,113 | 3,328 | 18 | 4,633 |
| 1862 | { H.R.H. The Prince Consort 1st Viscount Portman } | 83 | 97 | 1,151 | 3,475 | 17 | 4,823 |
| 1863 | Viscount Eversley | 80 | 88 | 1,263 | 3,735 | 17 | 5,183 |
| 1864 | 2nd Lord Feversham | 78 | 45 | 1,343 | 4,013 | 17 | 5,496 |
| 1865 | Sir E. C. Kerrison, Bart., M.P. | 79 | 81 | 1,386 | 4,190 | 16 | 5,752 |
| 1866 | 1st Lord Tedegar | 79 | 84 | 1,395 | 4,049 | 15 | 5,622 |
| 1867 | Mr. H. S. Thompson | 77 | 82 | 1,388 | 3,903 | 15 | 5,465 |
| 1868 | 6th Duke of Richmond | 75 | 74 | 1,409 | 3,888 | 15 | 5,461 |
| 1869 | H.R.H. The Prince of Wales, K.G. | 75 | 73 | 1,417 | 3,864 | 17 | 5,446 |
| 1870 | 7th Duke of Devonshire | 74 | 74 | 1,511 | 3,764 | 15 | 5,436 |
| 1871 | 6th Lord Vernon | 72 | 74 | 1,589 | 3,896 | 17 | 5,648 |
| 1872 | Sir W. W. Wynn, Bart., M.P. | 71 | 73 | 1,655 | 3,953 | 14 | 5,768 |
| 1873 | Earl Cathcart | 74 | 62 | 1,832 | 3,936 | 12 | 5,916 |
| 1874 | Mr. Edward Holland | 76 | 58 | 1,944 | 3,756 | 12 | 5,846 |
| 1875 | Viscount Bridport | 79 | 79 | 2,058 | 3,918 | 11 | 6,145 |
| 1876 | 2nd Lord Chesham | 83 | 78 | 2,164 | 4,013 | 11 | 6,349 |
| 1877 | Lord Skelmersdale | 81 | 76 | 2,239 | 4,073 | 17 | 6,486 |
| 1878 | Col. Kingscote, C.B., M.P. | 81 | 72 | 2,328 | 4,130 | 26 | 6,637 |
| 1879 | H.R.H. The Prince of Wales, K.G. | 81 | 72 | 2,453 | 4,700 | 26 | 7,332 |
| 1880 | 9th Duke of Bedford | 83 | 70 | 2,673 | 5,083 | 20 | 7,929 |
| 1881 | Mr. William Wells | 85 | 69 | 2,765 | 5,041 | 19 | 7,979 |
| 1882 | Mr. John Dent Dent | 82 | 71 | 2,849 | 5,059 | 19 | 8,080 |
| 1883 | 6th Duke of Richmond and Gordon | 78 | 71 | 2,979 | 4,952 | 19 | 8,099 |
| 1884 | Sir Brandreth Gibbs | 72 | 72 | 3,203 | 5,408 | 21 | 8,776 |
| 1885 | Sir M. Lopes, Bart., M.P. | 71 | 69 | 3,356 | 5,619 | 20 | 9,135 |
| 1886 | H.R.H. The Prince of Wales, K.G. | 70 | 61 | 3,414 | 5,569 | 20 | 9,134 |
| 1887 | Lord Egerton of Tatton | 71 | 64 | 3,440 | 5,387 | 20 | 8,982 |
| 1888 | Sir M. W. Ridley, Bart., M.P. | 66 | 56 | 3,521 | 5,225 | 16 | 8,884 |
| 1889 | HER MAJESTY QUEEN VICTORIA | 73 | 58 | 3,567 | 7,153 | 15 | 10,866 |
| 1890 | Lord Moreton | 122 | 58 | 3,846 | 6,941 | 17 | 10,984 |
| 1891 | 2nd Earl of Ravensworth | 117 | 60 | 3,811 | 6,921 | 19 | 10,928 |
| 1892 | Earl of Feversham | 111 | 69 | 3,784 | 7,066 | 20 | 11,050 |
| 1893 | 1st Duke of Westminster, K.G. | 107 | 74 | 3,786 | 7,138 | 21 | 11,126 |
| 1894 | 8th Duke of Devonshire, K.G. | 113 | 73 | 3,798 | 7,212 | 22 | 11,218 |
| 1895 | Sir J. H. Thorold, Bart. | 120 | 80 | 3,747 | 7,179 | 23 | 11,149 |
| 1896 | Sir Walter Gilbey, Bart. | 126 | 83 | 3,695 | 7,253 | 23 | 11,180 |
| 1897 | H.R.H. The Duke of York, K.G. | 126 | 83 | 3,705 | 7,285 | 24 | 11,223 |
| 1898 | Earl Spencer, K.G. | 121 | 79 | 3,687 | 7,182 | 25 | 11,094 |
| 1899 | Earl of Coventry | 116 | 75 | 3,656 | 7,009 | 23 | 10,879 |
| 1900 | H.R.H. The Prince of Wales, K.G. | 111 | 71 | 3,628 | 6,832 | 24 | 10,666 |
| 1901 | Earl Cawdor | 102 | 70 | 3,564 | 6,338 | 27 | 10,033 |
| 1902 | H.R.H. Prince Christian, K.G. | 100 | 69 | 3,500 | 5,955 | 26 | 9,650 |
| 1903 | H.R.H. The Prince of Wales, K.G. | 99 | 62 | 3,439 | 5,771 | 27 | 9,398 |
| 1904 | 10th Earl of Derby, K.G. | 96 | 68 | 3,375 | 5,906 | 32 | 9,477 |
| 1905 | Lord Middleton | 95 | 72 | 3,270 | 5,808 | 31 | 9,276 |
| 1906 | Mr. F. S. W. Cornwallis | 94 | 155 | 3,132 | 6,189 | 30 | 9,600 |
| 1907 | Earl of Yarborough | 91 | 174 | 3,076 | 6,299 | 29 | 9,669 |
| 1908 | Duke of Devonshire | 89 | 178 | 3,019 | 6,442 | 30 | 9,758 |
| 1909 | Earl of Jersey, G.C.B. | 91 | 177 | 2,951 | 6,696 | 31 | 9,946 |
| 1910 | Sir Gilbert Greenall, Bart. | 86 | 166 | 2,878 | 6,934 | 31 | 10,095 |
| 1911 | HIS MAJESTY KING GEORGE V. | 85 | 168 | 2,805 | 7,191 | 30 | 10,279 |
| 1912 | Lord Middleton | 85 | 170 | 2,741 | 7,283 | 30 | 10,309 |

STATEMENT made to the Council by the Chairman of the Finance Committee, on presenting the Accounts for the year 1912.

Mr. ADEANE, in presenting, on behalf of the Finance Committee, the accounts of the Society for the year 1912, said that as these were similar to those presented for the year 1911, he would only have to detain the Council a short time.

The income for last year was just 36*l.* less than it was in the preceding year. The expenditure was less in 1912 than in 1911 by 366*l.*, and this was partly due to the payment in the year 1911 of the first instalment, amounting to 259*l.*, for the insurance scheme of the officials of the Society. The total income for 1912 was 9,755*l.*, and the total expenditure 9,402*l.*, leaving a credit balance at the end of the year of 353*l.*

With regard to the balance-sheet, at the end of 1912 the capital of the Society stood at 51,478*l.*, against 49,484*l.* in the preceding year. On the credit side of that account it would be noticed that the invested Reserve Fund stood at the same figure as in 1911, but there was a further sum of 2,143*l.* under the heading of cash at bankers, which belonged to the account of the Reserve Fund, and which, together with the credit balance on the ordinary account of 353*l.*, the Council would be asked to invest. This would bring the Reserve Fund to 45,928*l.*, valued at cost price. It was very much to be regretted that their investments in Consols showed a further depreciation on last year of something like 900*l.*, and, taking that depreciation into consideration, they recommended that the 2,500*l.* which they had to invest should be put into 3 per cent. Metropolitan Consolidated Stock, which was terminable at par in 1941, and was therefore likely to appreciate as it approached the period of its extinction, and which, at the present price of 88, would pay about 3½ per cent.

FORECAST OF ORDINARY RECEIPTS AND EXPENDITURE FOR 1913.

(Other than in respect of the Show.)

Prepared by direction of the Finance Committee on the basis of the recommendations of September 21, 1905, made by the Special Committee.

| Actual Figures for 1912. | | Receipts. | £ |
|--------------------------------|--|--------------|-------|
| 8,158 | From Subscriptions for 1913 of Governors and Members | | 8,160 |
| 105 | From Interest on Daily Balances | | 100 |
| 1,214 | From Interest on Investments | | 1,270 |
| 278 | From Sales of Text Book, Pamphlets, &c. (This does not include the sales of Journals which are deducted from the cost of production) | | 270 |
| 9,755 | | | 9,800 |
| | | Expenditure. | £ |
| 1,565 | Salaries of Secretary and Official Staff | | 1,586 |
| 140 | Pensions to Officials | | 140 |
| 725 | Rent, Lighting, Cleaning, Wages, &c. (say) | | 720 |
| 582 | Printing and Stationery | | 550 |
| 216 | Postage and Telegrams | | 200 |
| 292 | Miscellaneous | | 400 |
| 847 | Journal | | 880 |
| 766 | Chemical Department | | 750 |
| 255 | Botanical Department | | 250 |
| 200 | Zoological Department | | 200 |
| 402 | Veterinary Department | | 400 |
| 185 | Examinations for National Diplomas (R.A.S.E. Share) | | 200 |
| 2,500 | Contribution from Subscriptions to Show Fund | | 2,500 |
| 8,675 | | | 8,776 |

Exceptional Expenditure.

| £ | | £ |
|-------|--|-------|
| 286 | Tuberculosis Experiment | 150 |
| 116 | <i>Trials of Drills</i> | — |
| — | <i>Trials of Milking Machines, &c.</i> | 400 |
| 22 | <i>Hills' Bequest : Excess Expenditure</i> | — |
| — | <i>Library Catalogue and Binding Books</i> | 25 |
| 241 | <i>Elements of Agriculture—New Edition (balance of cost)</i> | — |
| 31 | <i>New Die for Medal</i> | — |
| 31 | <i>Agricultural Research Essay</i> | — |
| — | Contribution to British Overseas Section | 100 |
| — | Painting and Cleaning Interior of 16 Bedford Square | 200 |
| <hr/> | | <hr/> |
| 9,402 | Total Estimated Expenditure | 9,651 |
| <hr/> | | <hr/> |
| | | £ |
| | Estimated Receipts | 9,800 |
| | Estimated Expenditure | 9,651 |
| <hr/> | | <hr/> |
| 353 | Estimated Receipts over Expenditure | 149 |
| <hr/> | | <hr/> |

He then dealt with the estimate of receipts and expenditure for the year 1913. They estimated that they would receive from Subscriptions for 1913 of Governors and Members 8,160*l.*, from Interest on Daily Balances 100*l.*, from Interest on Investments 1,270*l.*, and from Sales of Text Book, Pamphlets, &c., 270*l.*, making a total of 9,800*l.* The expenditure they estimated as follows:—Salary of Secretary and Official Staff, 1,586*l.*; Pensions to Officials, 140*l.*; Rent, Lighting, Cleaning, Wages, &c. (say) 720*l.*; Printing and Stationery, 550*l.*; Postage and Telegrams, 200*l.*; Miscellaneous, 400*l.*; Journal, 880*l.*; Chemical Department, 750*l.*; Botanical Department, 250*l.*; Zoological Department, 200*l.*; Veterinary Department, 400*l.*; Examinations for National Diplomas, 200*l.*; Contributions from Subscriptions to Show Fund, 2,500*l.*; giving a total estimated ordinary expenditure of 8,776*l.*

Under the head of exceptional expenditure they thought that the Tuberculosis Experiment at Woburn, which would terminate this year, would cost 150*l.*, and if it did not exceed that figure they would be within the limit of 800*l.* which the Council voted three years ago for the purpose of the experiment. He had been told by the Chairman of the Implement Committee that the Trials of Milking Machines would cost 400*l.*, the entries having been more numerous than was first expected. For the Library Catalogue and Binding Books 25*l.* had been allowed. Under the heading of contribution to the British Overseas Section he asked them to vote 100*l.* He then read a few lines of a letter received by Mr. McRow from the Bristol Committee, in which they said they would like to bring before the Council the question of their making a grant towards the overseas programme. As it would be advertising the Bristol Show in Canada and other Dominions, he thought it advisable that the Society should do as they had been asked. Then the time was approaching when the Society must thoroughly clean the house, and they estimated that this would cost 200*l.* The total estimated expenditure was, therefore, 9,651*l.*, and they estimated that the credit balance of receipts over expenditure would be 149*l.* at the end of the year.

Royal Agricultural Society of England.

STATEMENT OF FUNDS HELD BY THE SOCIETY IN TRUST OR WHICH ARE NOT
CONSIDERED AVAILABLE FOR GENERAL PURPOSES, DECEMBER 31, 1912.

| | | | | | | | |
|--|---|----|--------------|---|---|----|--------------|
| To Hills' Bequest for Pot-culture Experiments | £ | s. | d. | By 8,12 <i>½</i> l. 8 <i>s.</i> 2 <i>d.</i> Consols at cost | £ | s. | d. |
| | | | 9,000 0 0 | | | | 9,000 0 0 |
| To Fund provided by Sir Walter Gilbey for Endow- ment of Lectureship at Cambridge until July 31, 1917, when any balance on this account will become the property of the Society | | | 1,041 7 10 | By 1,140 <i>l.</i> Metropolitan Water A Stock at cost | | | 998 1 0 |
| | | | | By amount included in the Society's Sundry Creditors' Account :— | £ | s. | d. |
| | | | | Fund uninvested | | | 1 19 0 |
| | | | | Accumulated income | | | 41 7 10 |
| | | | £1,041 7 10 | | | | 43 6 10 |
| | | | | | | | £1,041 7 10 |
| To Superannuation and Insurance Fund :— Amount set aside in accordance with Declaration of Trust of July 26, 1911 | | | 9,171 5 0 | By Investments in names of Trustees of Super- annuation and Insurance Funds, viz. :— | | | 9,171 5 0 |
| Accumulations to December 31, 1912 | | | 247 11 11 | 11,000 <i>l.</i> Consols at cost | | | |
| | | | | (<i>Value on December 31, 1912, at 75½ = £8,305</i>). | | | |
| | | | | 82 <i>l.</i> 2 <i>s.</i> 5 <i>d.</i> West Australian 3½% at cost | | | 78 17 5 |
| | | | | 38 <i>l.</i> 7 <i>s.</i> 10 <i>d.</i> Queensland 3½% at cost | | | 37 2 9 |
| | | | | Cash at Bank | | | 131 11 9 |
| | | | £9,418 16 11 | | | | £9,418 16 11 |

Examined, audited, and found correct, this 30th day of January, 1913.

THOMAS MCROW, Secretary. }
HUBERT J. GREENWOOD, } *Auditors on*
NEWELL P. SQUAREY, } *behalf of*
the Society.

SOCIETY OF ENGLAND.

xi

DECEMBER 31, 1912.

Cr.

Correspond-
ing figures
for 1911.

| | | £ | s. | d. | £ | s. | d. |
|---------|---|-------|----|----|---------|----|----|
| 43,428 | By Reserve Fund 52,333 <i>l.</i> 5 <i>s.</i> 6 <i>d.</i> Consols, at cost (average cost 83 $\frac{2}{3}$) | | | | 43,428 | 15 | 0 |
| | (Value on December 31, 1912, at 75 $\frac{1}{2}$ =39,511 <i>l.</i> 12 <i>s.</i> 5 <i>d.</i>) | | | | | | |
| 2,500 | By LEASE OF 16 BEDFORD SQUARE | 2,500 | 0 | 0 | | | |
| | Less Amount written off | 100 | 0 | 0 | 2,400 | 0 | 0 |
| 412 | By FIXTURES— | | | | | | |
| | Value at December 30, 1911 | 412 | 1 | 0 | | | |
| | Less Depreciation at 7 $\frac{1}{2}$ per cent. | 30 | 18 | 1 | 381 | 2 | 11 |
| 1,287 | By FURNITURE— | | | | | | |
| | Value at December 30, 1911 | 1,286 | 14 | 1 | | | |
| | Less Depreciation at 10 per cent. | 128 | 13 | 4 | 1,158 | 0 | 9 |
| 1,500 | By PICTURES (500 <i>l.</i>) and BOOKS (1,000 <i>l.</i>) | | | | 1,500 | 0 | 0 |
| 73 | By MACHINERY— | | | | | | |
| | Value at December 30, 1911 | 72 | 16 | 1 | | | |
| | Less Depreciation at 10 per cent. | 7 | 5 | 7 | 65 | 10 | 6 |
| 1,648 | By SHOW PLANT— | | | | | | |
| | Value at December 30, 1911 | 1,648 | 4 | 8 | | | |
| | Less Depreciation at 10 per cent. | 164 | 16 | 5 | | | |
| | Added during 1912 | 1,483 | 8 | 3 | 1,490 | 1 | 3 |
| | | 6 | 13 | 0 | | | |
| 400 | By BUILDINGS FOR POT EXPERIMENTS AT WOBURN— | | | | | | |
| | As per Account at December 30, 1911 | 400 | 0 | 0 | | | |
| | Less Depreciation | 50 | 0 | 0 | 350 | 0 | 0 |
| 1,170 | By SUNDRY DEBTORS | | | | 1,402 | 13 | 7 |
| 133 | By CASH AT BANKERS AND IN HAND— | | | | | | |
| 121 | Ordinary Account | 2,129 | 18 | 5 | | | |
| 53 | Reserve Fund Account | 2,143 | 1 | 5 | | | |
| 307 | In Hand | 33 | 4 | 2 | 4,306 | 4 | 0 |
| | | | | | | | |
| £52,725 | | | | | £56,482 | 8 | 0 |

Examined, audited, and found correct, this 30th day of January, 1913.

JONAS M. WEBB,
HUBERT J. GREENWOOD, } Auditors on behalf of the Society.
NEWELL P. SQUAREY,

The Expenditure in this account includes not only cash payments,

Corresponding figures for 1911.

Income.

| £ | | £ s. d. | £ s. d. |
|-------|---|------------|-----------|
| | ANNUAL SUBSCRIPTIONS:— | | |
| 911 | <i>Governors:</i> Subscriptions for 1912 | 922 5 0 | |
| 175 | <i>Members:</i> Received in 1911, but belonging to 1912 | 92 1 0 | |
| 6,703 | Subscriptions for 1912 | 6,802 3 0 | |
| 176 | Subscriptions for 1912 (additional) | 157 7 0 | |
| 56 | Subscriptions for previous years | 76 3 0 | |
| | LIFE GOVERNORS AND MEMBERS:— | | |
| 130 | Annual Contributions | 108 4 0 | |
| 8,151 | | | 8,158 3 0 |
| | MISCELLANEOUS:— | | |
| 110 | Interest on Daily Balances | 105 9 0 | |
| 1,221 | Income on Investments | 1,213 14 5 | |
| 59 | Sales of Pamphlets, Diagrams, &c. | 26 16 4 | |
| 242 | Sales of Text Book | 226 0 4 | |
| 17 | Miscellaneous | 25 4 0 | |
| 1,640 | | | 1,597 4 1 |
| | Rent of 12 Hanover Square | 310 15 0 | |
| | <i>Less</i> Rent paid | 310 15 0 | |

£9,791£9,755 7 1

AND EXPENDITURE FOR THE YEAR 1912.

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but all liabilities in connection with the year's transactions.

Correspond-
ing figures
for 1911.

Expenditure.

| | £ | s. | d. | £ | s. | d. |
|--|---|-----|----|-------|-----|------------|
| GENERAL ADMINISTRATION:— | | | | | | |
| 1,543 | Salaries of Official Staff | | | 1,565 | 10 | 8 |
| 259 | Pensions to Officials | | | 140 | 0 | 0 |
| 140 | Professional Charges:—Auditors' Fees, &c. | | | 58 | 16 | 0 |
| 97 | Rent, Rates, Taxes, Insurance, and House Expenses | | | 725 | 7 | 5 |
| 877 | Binding and Purchase of Books | | | 20 | 8 | 0 |
| 30 | Printing and Stationery | | | 581 | 18 | 9 |
| 528 | Postage and Telegrams | | | 215 | 19 | 11 |
| 179 | Carriage of Parcels and Travelling Expenses | | | 87 | 15 | 9 |
| 71 | (including annual visit to Woburn) | | | 124 | 18 | 9 |
| 100 | Advertising and Miscellaneous Office Expenses | | | | | |
| 3,824 | | | | | | 3,820 15 3 |
| JOURNAL OF THE SOCIETY, VOL. 73:— | | | | | | |
| 572 | Printing, Binding, &c. | | | 625 | 0 | 0 |
| 205 | Postage, Packing, and Delivery | | | 205 | 0 | 0 |
| 280 | Editing and Literary Contributions | | | 270 | 0 | 0 |
| 30 | Illustrations | | | 70 | 0 | 0 |
| 1,087 | | | | | | 1,170 0 0 |
| | | £ | s. | d. | | |
| | Less Sales (Vol. 72 and earlier) | 70 | 13 | 1 | | |
| 357 | Advertisements (Vol. 73) | 270 | 0 | 0 | | |
| | | | | | 340 | 13 1 |
| | | | | | 829 | 6 11 |
| | Add:—Debit Balance from Vol. 72 | | | | 17 | 10 10 |
| 730 | | | | | | 846 17 9 |
| ELEMENTS OF AGRICULTURE:— | | | | | | |
| 278 | Printing New Edition (Two-thirds cost) | | | | | 240 17 1 |
| 30 | | | | | | |
| LABORATORY:— | | | | | | |
| 615 | Salaries, Wages, &c. | | | | | 765 19 10 |
| OTHER SCIENTIFIC DEPARTMENTS:— | | | | | | |
| 300 | Botanist's Salary and Expenses | | | 255 | 2 | 9 |
| 200 | Zoologist's Salary | | | 200 | 0 | 0 |
| 400 | Grant to Royal Veterinary College | | | 400 | 0 | 0 |
| 2 | Medals for Proficiency in Cattle Pathology | | | 2 | 6 | 6 |
| 902 | | | | | | 837 9 3 |
| NATIONAL DIPLOMA IN AGRICULTURE:— | | | | | | |
| 170 | Honoraria and Expenses of Examiners | | | 173 | 12 | 5 |
| 26 | Travelling Expenses of Officials | | | 43 | 1 | 9 |
| 30 | Hotel Expenses of Examiners and Officials | | | 43 | 19 | 2 |
| 24 | Printing, Stationery, and Postage | | | 40 | 11 | 6 |
| 16 | Writing Diplomas | | | 15 | 2 | 0 |
| 50 | Salaries for Assistants | | | 49 | 10 | 0 |
| 316 | | | | | | 365 16 10 |
| 88 | Less Entry Fees and Sales of Examination Papers | | | | | 106 15 1 |
| 228 | | | | | | 259 1 9 |
| 114 | Less Highland and Agricultural Society's Moiety | | | | | 129 10 10 |
| 114 | | | | | | 129 10 11 |
| NATIONAL DIPLOMA IN DAIRYING:— | | | | | | |
| 41 | Hire of Premises, &c. | | | 24 | 1 | 4 |
| 40 | Fees to Examiners | | | 41 | 1 | 4 |
| 25 | Hotel and Travelling Expenses | | | 24 | 6 | 4 |
| 11 | Printing and Postage | | | 4 | 18 | 6 |
| 117 | | | | | | 94 7 6 |
| 36 | Less Entry Fees and Sales of Examination Papers | | | | | 40 1 8 |
| 81 | | | | | | 54 5 10 |
| EXTRA EXPENDITURE:— | | | | | | |
| — | Calf Experiments at Woburn | | | 285 | 11 | 2 |
| — | Trials of Drills | | | 116 | 2 | 7 |
| — | Hills' Bequest:—Excess expenditure for 1911 | | | 22 | 16 | 11 |
| — | New Die for Medal | | | 30 | 10 | 0 |
| — | Agricultural Research Essay | | | 31 | 10 | 0 |
| 693 | | | | | | 486 10 8 |
| 2,500 | CONTRIBUTION TO SHOW FUND | | | | | 2,500 0 0 |
| 23 | CREDIT BALANCE CARRIED TO BALANCE-SHEET | | | | | 353 0 6 |
| £9,791 | | | | | | £9,755 7 1 |

Examined, audited, and found correct, this 30th day of January, 1913.

JONAS M. WEBB.
HUBERT J. GREENWOOD, } Auditors on behalf of the Society.
NEWELL P. SQUAREY.

Corresponding figures for 1911.

Receipts.

| £ | | £ s. d. | £ s. d. |
|---------|---|------------|--------------|
| 2,000 | Subscription from Doncaster Local Committee | | 2,000 0 0 |
| — | Prizes given by Agricultural and Breed Societies | 501 11 0 | |
| — | Do. do. Doncaster Local Committee. | 1,891 0 0 | |
| 4,166 | | | 2,392 11 0 |
| | Contributions from Stock Exhibitors | | 290 2 0 |
| 6,489 | FEES FOR ENTRY OF IMPLEMENTS :— | | |
| 168 | Implement Exhibitors' Payments for Shedding | 6,366 6 0 | |
| 59 | Non-Members' Fees for Entry of Implements. | 179 0 0 | |
| 6,716 | Fees for Entry of "New Implements" | 52 0 0 | |
| | | | 6,597 6 0 |
| | FEES FOR ENTRY OF LIVE STOCK :— | £ s. d. | |
| | By 2,249 Members' Entries @ 1l. | 2,249 0 0 | |
| | 616 Members' Entries @ 2l. | 1,232 0 0 | |
| | 19 Substituted Entries @ 5s. | 4 15 0 | |
| | By 70 Entries @ 10s. | 35 0 0 | |
| | 215 Entries @ 5s. | 53 15 0 | |
| | | 3,574 10 0 | |
| 3,538 | Less Fees Returned | 2,137 15 0 | |
| | | | 1,436 15 0 |
| | By 136 Non-Members' Entries @ 2l. | 272 0 0 | |
| | 59 Non-Members' Entries @ 4l. | 236 0 0 | |
| | 2 Substituted Entries @ 10s. | 1 0 0 | |
| | | 509 0 0 | |
| 344 | Less Fees Returned | 271 0 0 | |
| 3,882 | | | 238 0 0 |
| | | | 1,674 15 0 |
| 34 | FEES FOR ENTRY OF POULTRY :— | | |
| 166 | By Members :—256 Entries @ 2s. 6d. | 32 0 0 | |
| 200 | By Non-Members :—987 Entries @ 3s. 6d. | 172 14 6 | |
| | | | 204 14 6 |
| | OTHER ENTRY FEES :— | | |
| 63 | Produce | 63 2 0 | |
| 49 | Horse-shoeing Competitions | 53 10 0 | |
| 10 | Butter-making Competitions | 3 10 0 | |
| 64 | Horse-jumping Competitions | 57 0 0 | |
| 151 | Farm Prize Competitions | 114 10 0 | |
| 29 | Plantations Competitions | 16 13 0 | |
| 366 | | | 308 5 0 |
| | CATALOGUE :— | | |
| 24 | Extra Lines for Particulars of Implement Exhibits | £ s. d. | |
| 8 | Woodcuts of "New Implements" | 21 12 0 | |
| 427 | Advertising in Catalogue | 6 5 0 | |
| 21 | Sales of Implement Section of Catalogue | 405 16 11 | |
| 436 | Sales of Combined Catalogue | 19 14 6 | |
| 21 | Sales of Jumping Programme | 438 9 10 | |
| 937 | | 17 0 0 | |
| 36 | | | 908 18 3 |
| 901 | Less Commission on Sales | | 32 18 0 |
| | | | 876 0 3 |
| | MISCELLANEOUS RECEIPTS :— | | |
| 451 | Admission to Horticultural Exhibition | | |
| — | Admission to Garage | 97 6 9 | |
| — | Admission to Dog Show (25 % of net takings). | 13 5 0 | |
| 75 | Premium for Supply of Refreshments | 75 0 0 | |
| 97 | Rent for Railway Offices | 103 10 0 | |
| 60 | Premium for Cloak Room | 60 0 0 | |
| 30 | Rent for Board of Agriculture Pavilion | 30 0 0 | |
| 6 | Nurse Cows. | — | |
| 17 | Miscellaneous | 30 8 5 | |
| 736 | | | 409 10 2 |
| £18,967 | Carried forward | | £14,783 3 11 |

DITURE OF THE SHOW AT DONCASTER,

xv

6, 1912.

Corresponding figures for 1911.

Expenditure.

| | | £ | s. | d. | £ | s. | d. |
|--|--|--------|----|----|---------|----|----|
| COST OF ERECTION OF SHOWYARD:— | | | | | | | |
| 1,230 | Transferring Society's Permanent Buildings from Norwich to Doncaster (including taking down and re-erecting) | 1,231 | 11 | 0 | | | |
| 472 | Fencing round Showyard | 536 | 17 | 0 | | | |
| 1,293 | Implement Shedding | 1,395 | 19 | 11 | | | |
| 3,379 | Stock Shedding | 2,987 | 19 | 3 | | | |
| 249 | Poultry and Produce Sheds | 365 | 2 | 6 | | | |
| 243 | Dairy | 299 | 10 | 9 | | | |
| 88 | Fodder Shed and Office | 63 | 14 | 0 | | | |
| 337 | Grand Stand and Large Ring | 351 | 4 | 4 | | | |
| 127 | Horse-shoeing Shed and Stabling | 131 | 19 | 4 | | | |
| 717 | Various Offices and Stands | 579 | 10 | 2 | | | |
| 531 | Printing Signs and fixing do., Fencing and Judging Rings | 346 | 5 | 2 | | | |
| 190 | Education and Forestry Exhibition | 175 | 10 | 7 | | | |
| 11 | Insurance | 13 | 4 | 9 | | | |
| 30 | Ironmongery | 9 | 10 | 2 | | | |
| 1,187 | Hire of Canvas and Felt | 1,158 | 3 | 7 | | | |
| 698 | General Labour and Horse Hire (including Society's Clerk of Works) | 783 | 2 | 1 | | | |
| 10,782 | | 10,429 | 4 | 7 | | | |
| 40 | Less 80 Flag Poles at 10s. | 40 | 0 | 0 | | | |
| 10,742 | | | | | 10,389 | 4 | 7 |
| SURVEYOR:— | | | | | | | |
| 335 | Salary, 300l.; Travelling Expenses to London, 25l. 16s.; Petty Cash, 2l. | | | | 327 | 16 | 0 |
| PRINTING:— | | | | | | | |
| 611 | Printing of Prize Sheets, Entry Forms, Admission Orders, Circulars to Exhibitors, Prize Cards, &c., Tickets, and Miscellaneous | 615 | 15 | 11 | | | |
| 125 | Programmes for Members | 143 | 15 | 9 | | | |
| 26 | Plans of Showyard | 28 | 3 | 6 | | | |
| 860 | Printing of Catalogues | 846 | 2 | 4 | | | |
| 74 | Binding of Catalogues | 60 | 17 | 0 | | | |
| 58 | Carriage of Catalogues | 25 | 14 | 4 | | | |
| 12 | Printing Awards | 45 | 14 | 0 | | | |
| 1,766 | Programmes of Jumping Competitions | 10 | 17 | 6 | | | |
| | | | | | 1,777 | 0 | 4 |
| ADVERTISING:— | | | | | | | |
| 185 | Advertising Closing of Entries in Newspapers | 170 | 14 | 1 | | | |
| 177 | Advertising Show in Newspapers | 243 | 9 | 5 | | | |
| 219 | Bill Posting | 631 | 16 | 8 | | | |
| 300 | Printing of Posters | 322 | 11 | 9 | | | |
| 80 | Press Visit before Show | 126 | 6 | 0 | | | |
| 970 | | | | | 1,514 | 17 | 11 |
| POSTAGE, CARRIAGE, &C.:— | | | | | | | |
| 106 | General Postage | 116 | 7 | 10 | | | |
| 34 | Postage of Badges to Members | 36 | 8 | 0 | | | |
| 9 | Carriage of Luggage | 15 | 2 | 0 | | | |
| 149 | | | | | 167 | 17 | 10 |
| 9,614 | AMOUNT OF MONEY PRIZES AWARDED, including 2,392l. 11s. given by various Societies and Doncaster Local Committee (see receipt <i>per contra</i>). | | | | 4,687 | 0 | 0 |
| COST OF FORAGE FOR LIVE STOCK:— | | | | | | | |
| 1,185 | Hay, 224l. 3s. 2d.; Straw, 350l. 9s. 6d.; Green Food, 95l. 6s. 2d.; Wages, 36l. 9s. 1d.; Commission on Sales, 13l. 13s. 0d.; Miscellaneous, 10l. 16s. 6d. | 730 | 17 | 6 | | | |
| | Less Sales of Litter | 9 | 5 | 0 | | | |
| | | | | | 721 | 12 | 6 |
| JUDGES' FEES AND EXPENSES:— | | | | | | | |
| 589 | Judges of Miscellaneous Implements, 21l. 15s. 6d.; Horses, 109l. 14s. 8d.; Cattle, 51l. 4s. 9d.; Sheep, 57l. 10s. 3d.; Pigs, 8l. 14s. 2d.; Poultry, 29l. 6s. 5d.; Butter, 3l. 12s.; Butter-making, 8l. 7s. 2d.; Cheese, 14l. 0s. 7d.; Cider and Perry, 24l. 10s. 1d.; Bread, 4l. 7s. 6d.; Wool, 3l. 13s. 6d.; Horse-shoeing, 29l. 3s.; Luncheons, 14l. 5s. | 380 | 3 | 7 | | | |
| 42 | Badges for Judges and other Officials | | | | 45 | 10 | 3 |
| 45 | Rosettes | | | | 41 | 2 | 10 |
| 25,437 | Carried forward | | | | £20,052 | 7 | 10 |

Corresponding
figures
for 1911.Receipts (*contd.*).

| £ | | £ s. d. | £ s. d. |
|--------|---------------------------|---------|-------------|
| 18,967 | Brought forward | | 14,753 3 11 |

ADMISSIONS TO SHOWYARD:—

| | | |
|-------|--------------------------------------|------------|
| 219 | Tuesday, July 2, @ 5s. | 342 10 0 |
| 868 | Wednesday, July 3, @ 2s. 6d. | 1,282 0 1 |
| 2,450 | Thursday, July 4, @ 2s. 6d. | 2,178 2 4 |
| 3,183 | Friday, July 5, @ 1s. | 1,714 6 9 |
| 789 | Saturday, July 6, @ 1s. | 929 6 3 |
| 53 | Season Tickets | 28 1 0 |
| 611 | Day Tickets | 388 10 8 |
| 8,173 | | 6,862 17 1 |

ENTRANCES TO HORSE RING:—

| | | |
|-------|---|----------|
| 114 | Wednesday, July 3 | 108 4 0 |
| 157 | Thursday, July 4 | 171 14 0 |
| 112 | Friday, July 5. | 131 8 0 |
| 46 | Saturday, July 6 | 52 18 0 |
| 695 | Tickets sold for Reserved Enclosure | 274 19 6 |
| 1,124 | | 739 3 6 |

SALES:—

| | | |
|-----|-------------------------------------|---------|
| 157 | Sales of Produce at Dairy | 62 12 4 |
| 262 | Auction Sales | |

532 Debit Balance

1,232 11 0

£29,215£23,660 7 10

Examined, audited, and found correct, this 28th day of November, 1912.

THOMAS MCROW, *Secretary.*
WELTON, JONES & Co., *Accountants.*

JONAS M. WEBB,
H. J. GREENWOOD,
NEWELL P. SQUAREY. } *Auditors on
behalf of
the Society.*

Corresponding figures for 1911.

Expenditure (*contd.*)

| | | £ s. d. | £ s. d. |
|---------|---|----------|---------------------|
| 25,437 | Brought forward | | 20,052 7 10 |
| | GENERAL ADMINISTRATION :— | | |
| 142 | Stewards :—Personal and Railway Expenses | 114 0 9 | |
| 149 | Assistant Stewards :—Personal and Railway Expenses | 130 1 0 | |
| 264 | Official Staff :—Extra Clerks, 74 <i>l.</i> 17 <i>s.</i> 7 <i>d.</i> ; Lodgings, 57 <i>l.</i> 3 <i>s.</i> 9 <i>d.</i> ; Maintenance of Clerks, 45 <i>l.</i> 5 <i>s.</i> 1 <i>d.</i> ; Travelling Expenses, 9 <i>l.</i> 13 <i>s.</i> 4 <i>d.</i> ; Secretary's Hotel and Travelling Expenses, 63 <i>l.</i> 13 <i>s.</i> 5 <i>d.</i> | 250 13 2 | |
| 102 | Finance Office :—Superintendent of Turnstiles, 10 <i>l.</i> ; Grand Stand Men, 23 <i>l.</i> 14 <i>s.</i> 1 <i>d.</i> ; Turnstile Men, 34 <i>l.</i> 10 <i>s.</i> ; Bank Clerks, 19 <i>l.</i> 16 <i>s.</i> | 88 0 1 | |
| 42 | Awards Office :—Clerks, 22 <i>l.</i> 13 <i>s.</i> ; Awards Boys, 6 <i>l.</i> 10 <i>s.</i> ; Refreshments, 2 <i>l.</i> 19 <i>s.</i> | 32 2 0 | |
| 699 | | | 614 17 0 |
| 94 | General Management :— | | |
| 37 | Foreman and Assistant Foremen | 107 0 11 | |
| 39 | Yardmen and Foddermen | 46 16 11 | |
| 95 | Door and Gate Keepers | 62 11 0 | |
| 136 | Veterinary Department :—Veterinary Inspectors | 94 18 8 | |
| 610 | Engineering Department :—Consulting Engineer and Assistants, 99 <i>l.</i> 7 <i>s.</i> 8 <i>d.</i> ; House and Maintenance, 17 <i>l.</i> 13 <i>s.</i> 11 <i>d.</i> ; Police, &c.—Metropolitan Police, 610 <i>l.</i> 16 <i>s.</i> 9 <i>d.</i> ; Commissioners, 26 <i>l.</i> 10 <i>s.</i> 2 <i>d.</i> | 117 1 7 | |
| 1,011 | | 637 6 11 | 1,065 16 0 |
| — | Garage :—Superintendent, Foreman and Assistants | 37 17 1 | |
| 414 | Dairy :—Staff, 99 <i>l.</i> 17 <i>s.</i> 2 <i>d.</i> ; Milk, 31 <i>l.</i> 16 <i>s.</i> ; Cream, 19 <i>l.</i> 4 <i>s.</i> 3 <i>d.</i> ; Ice, 11 <i>l.</i> 14 <i>s.</i> 8 <i>d.</i> ; Utensils, 52 <i>l.</i> 0 <i>s.</i> 9 <i>d.</i> ; Salt, 3 <i>l.</i> 12 <i>s.</i> ; Carriage, 3 <i>l.</i> 12 <i>s.</i> 3 <i>d.</i> ; Engine, 6 <i>l.</i> 7 <i>s.</i> 6 <i>d.</i> ; Fuel, 2 <i>l.</i> 5 <i>s.</i> 8 <i>d.</i> ; Cheese and Butter Boxes, 4 <i>l.</i> 3 <i>s.</i> 6 <i>d.</i> ; Lodgings, 13 <i>l.</i> 2 <i>s.</i> 6 <i>d.</i> ; Refreshments, 3 <i>l.</i> 7 <i>s.</i> 4 <i>d.</i> ; Labour, 2 <i>l.</i> 4 <i>s.</i> 2 <i>d.</i> ; Miscellaneous Payments, 5 <i>l.</i> 13 <i>s.</i> 8 <i>d.</i> | 259 1 5 | |
| 38 | Poultry :—Superintendent, 12 <i>l.</i> 5 <i>s.</i> 6 <i>d.</i> ; Penning and Feeding, 14 <i>l.</i> 10 <i>s.</i> 6 <i>d.</i> ; Carriage, 9 <i>l.</i> 7 <i>s.</i> 3 <i>d.</i> | 36 3 3 | |
| 40 | Horse-shoeing :—Hire of Forges, 23 <i>l.</i> 14 <i>s.</i> 6 <i>d.</i> ; Gratuities, 7 <i>l.</i> 10 <i>s.</i> ; Wages, 7 <i>l.</i> 10 <i>s.</i> 3 <i>d.</i> ; Fuel, 1 <i>l.</i> 15 <i>s.</i> | 40 9 9 | |
| 24 | Produce :—Analyses of Cider | 18 0 0 | |
| 516 | | | 391 11 6 |
| 427 | Farm Prize Competition :—Expenses of Judging Farms, &c. | | 437 19 0 |
| 495 | Horticulture :—Hire of Tents, 211 <i>l.</i> 10 <i>s.</i> 8 <i>d.</i> ; Judges, 20 <i>l.</i> 6 <i>s.</i> 6 <i>d.</i> ; Wages, 67 <i>l.</i> 2 <i>s.</i> 8 <i>d.</i> ; Carriage, 23 <i>l.</i> 4 <i>s.</i> 1 <i>d.</i> ; Medals, 36 <i>l.</i> 3 <i>s.</i> 8 <i>d.</i> ; Printing, 12 <i>l.</i> ; Advertising, 16 <i>l.</i> 3 <i>s.</i> | | 386 10 7 |
| | GENERAL SHOWYARD EXPENSES :— | | |
| 84 | Band | 105 0 0 | |
| 67 | Official Luncheons | 46 0 0 | |
| 41 | Ambulance | 42 18 8 | |
| 49 | Telephone Extension | 45 10 0 | |
| 41 | Telegraph Extension | 42 1 9 | |
| 54 | Hire of Chairs | 51 14 6 | |
| 15 | Plans of Showyard | 18 11 5 | |
| 51 | Hire of Furniture | 75 0 0 | |
| 95 | Education and Forestry | 61 3 6 | |
| — | Hire of Horse Boxes outside Showyard | 35 17 0 | |
| 7 | Billposting in Showyard | 4 7 6 | |
| 9 | Gas | 2 8 10 | |
| 17 | Medals | 9 18 3 | |
| 2 | Carriage | 4 1 10 | |
| — | Hire of Safes | 10 2 6 | |
| 10 | Fire Station | 12 0 0 | |
| — | Hire of Sleepers | 8 8 0 | |
| — | Bathchairmen | 16 9 6 | |
| 10 | Hire of Weighbridge | 6 10 2 | |
| 46 | Class Plates | 12 10 0 | |
| — | Tan | 4 10 0 | |
| — | Storage of Plant | 8 0 0 | |
| 2 | Fodder for Stewards' Horses | 7 8 0 | |
| — | Floral Decorations | 5 0 0 | |
| — | Stable Lamps | 5 14 0 | |
| 30 | Gratuities, Pit Pony Classes, and Caretakers | 17 15 0 | |
| 630 | Miscellaneous | 42 5 6 | |
| | | | 701 5 11 |
| £29,215 | | | £23,650 7 10 |

Contribution from Ordinary Funds of the Society to the Show }
Fund

Less :—Actual loss on the Doncaster Show

£2,500 0 0

1,232 11 0

Balance carried to Reserve Fund

£1,267 9 0

DONCASTER SHOW, 1912.

Statement showing the distribution of the Prizes awarded in the several sections of the Doncaster Show, with comparative figures of the Norwich Show, 1911.

| Corresponding figures for 1911. | STATEMENT OF PRIZES AWARDED:— | | |
|---------------------------------------|---|--------|-------|
| £ | | £ | s. d. |
| 3,008 | Horses | 3,240 | 0 0 |
| 2,656 | Cattle | — | |
| 1,816 | Sheep | — | |
| 696 | Pigs | — | |
| 392 | Poultry | 385 | 10 0 |
| 92 | Cheese and Butter | 115 | 0 0 |
| 49 | Cider and Perry | 39 | 0 0 |
| 57 | Wool | 30 | 0 0 |
| 3 | Bread | 24 | |
| 47 | Horse-shoeing | 46 | 10 0 |
| 46 | Butter-making | 35 | 0 0 |
| 480 | Farms | 485 | 0 0 |
| 232 | Horticulture | 247 | 0 0 |
| 40 | Contribution to Bee Department | 40 | 0 0 |
| 9,614 | | 4,687 | 0 0 |
| 2,131 | Less:—Prizes given by various Societies, &c. | 501 | 11 0 |
| 2,035 | Prizes given by Doncaster Local Committee* | 1,891 | 0 0 |
| 4,166 | | 2,392 | 11 0 |
| 5,448 | | £2,294 | 9 0 |

NOTE.—In consequence of the Order of the Board of Agriculture, the Exhibition of Cattle, Sheep and Pigs was prohibited.

* In addition to this sum, the Doncaster Local Committee contributed £100 towards the Plantations and Home Nurseries Competitions.

[Copies of the full Report of any of the Council Meetings held during the year 1912 may be obtained on application to the Secretary, at 16 Bedford Square, London, W.C.]

ROYAL AGRICULTURAL SOCIETY OF ENGLAND.

Minutes of the Council.

WEDNESDAY, JANUARY 31, 1912.

At a Monthly Council, held at 16 Bedford Square, W.C., LORD MIDDLETON (President) in the Chair :—

Present :—Trustees.—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Earl of Coventry, Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, Mr. J. Marshall Dugdale, the Right Hon. Sir Ailwyn E. Fellowes, K.C.V.O., Mr. R. M. Greaves, Sir Gilbert Greenall, Bart., C.V.O., the Hon. Cecil T. Parker.

Other Members of the Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Mr. H. Dent Brocklehurst, Mr. Davis Brown, Mr. Richardson Carr, Mr. J. T. C. Eadie, Mr. Arthur E. Evans, Mr. J. Falconer, Mr. Howard Frank, Mr. W. T. Garne, Mr. J. W. Glover, Lord Harlech, Mr. Joseph Harris, Mr. W. Harrison, Lord Hastings, Sir A. G. Hazlerigg, Bart., Major H. G. Henderson, M.P., Mr. Bayntun Hippisley, Mr. Arthur Hiscock, Mr. R. W. Hobbs, Mr. W. F. Ingram, Sir Charles V. Knightley, Bart., Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. W. A. May, Mr. C. Middleton, Mr. G. Norris Midwood, Mr. T. H. Miller, Mr. John Myatt, Mr. W. Nocton, Mr. Henry Overman, Mr. R. G. Patterson, Mr. C. M. S. Pilkington, Mr. G. G. Rea, Mr. F. Reynard, Mr. C. Coltman Rogers, Mr. John Rowell, Mr. Fred Smith, Mr. E. W. Stanyforth, Mr. George Taylor, Mr. E. V. V. Wheeler, and Mr. L. C. Wrigley.

Governor.—Mr. Harold Swithinbank.

The following Members of the Doncaster Local Committee were also present :—Mr. C. Thellusson, Mr. W. Warde-Aldam, and Mr. F. H. Chafer (Local Secretary).

On taking his seat for the first time as President of the Society for the present year, Lord MIDDLETON thanked the Council for the honour they had done him in nominating him for that office a second time. He was sure that he would receive the same kind support and assistance as he did on the former occasion.

The PRESIDENT said he regretted to have to inform the Council that a message had been received from his Royal Highness Prince Christian expressing his inability to be present that day, owing to the death of the Duke of Fife. Members of the Council and of the Society as a whole would all regret the sad event, and he was sure that their deepest sympathy would be with the Princess Royal in her bereavement.

The minutes of the last meeting of the Council, held on Wednesday, December 6, 1911, were taken as read and confirmed.

The Earl of Guilford and Mr. H. C. Jeddere-Fisher, Apsleytown, East Grinstead, were elected as Governors, and thirty-four duly nominated candidates were admitted into the Society as Members.

The Report of the Finance Committee, together with the Accounts and Balance Sheet for 1911, and the Estimates for 1912, were received and adopted. A suggestion by Mr. MAY that a note should appear in the balance sheet explaining the market value of the Consols standing in the Society's name at the end of the year 1911 was also adopted by the Council.

On the motion of Mr. ADEANE, seconded by Sir GILBERT GREENALL, the Right Hon. Sir Ailwyn Fellowes was added to the Finance Committee.

Lord MORETON introduced a deputation from Bristol in connection with the invitation to the Society to hold the Show in that city in 1913. This deputation consisted of the following:—The Lord Mayor (Mr. Frank W. Wills), Alderman Hayes (Ex-Lord Mayor), Mr. C. H. Cave (Chairman of the Local Finance Committee), Mr. C. C. Savile (Master of the Society of Merchant Venturers, who own a portion of the site on which the Show will be held), Mr. James Kennedy (one of the Durdham Down Commoners), Mr. J. Green (representing the Town Clerk), Mr. Peter Addie (City Valuer), and Mr. George Nichols (Local Honorary Secretary). The PRESIDENT, in thanking the deputation—on behalf of the Council—for their presence that day, and for the cordial invitation extended to the Society, said the Council would be most glad to hold the Show in Bristol in 1913.

A deputation from the Borough of Shrewsbury and County of Salop in support of an invitation to the Society to hold the Show in Shrewsbury in 1914 was introduced by Sir J. B. BOWEN-JONES. The members of the deputation were Major C. B. Wingfield (Mayor of Shrewsbury), Alderman Blower, Mr. E. B. Feilden (High Sheriff of Shropshire), and Mr. Beville Stanier, M.P. (Hon. Treasurer of the Local Committee). Lord Harlech and Mr. Alfred Mansell (members of the Council) also attended as members of the deputation. Speeches in support of the invitation having been made by the MAYOR of SHREWSBURY, Mr. BLOWER, Mr. FEILDEN, Lord HARLECH, and Mr. STANIER, it was unanimously resolved on the motion of Sir J. B. BOWEN-JONES, seconded by Mr. WHEELER, "That the invitation accorded by the Mayor of Shrewsbury on behalf of the Borough of Shrewsbury and the County of Salop for the Society to hold its Show at Shrewsbury in 1914 be accepted, with the best thanks of the Society, and that the usual agreement with the Corporation be entered into in due course."

Other business having been transacted, the Council adjourned until Wednesday, February 28, 1912.

WEDNESDAY, FEBRUARY 28, 1912.

At a Monthly Council, held at 16 Bedford Square, W.C., Lord MIDDLETON (President) in the Chair:—

Present:—Trustees.—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Earl of Coventry, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, Mr. J. Marshall Dugdale, the Right Hon. Sir Ailwyn E. Fellowes, K.C.V.O., Sir Gilbert Greenall, Bart., C.V.O., the Hon. Cecil T. Parker.

Other Members of the Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Capt. Clive Behrens, Mr. E. W. Betts, Mr. H. Dent Brocklehurst, the Hon. J. E. Cross, Mr. H. Dudding, Mr. Howard Frank, Lord Harlech, Mr. W. Harrison, Lord Hastings, Sir A. G. Hazlerigg, Bart., Mr. R. W. Hobbs, Mr. W. J. Hosken, Mr. W. F. Ingram, Sir Charles V. Knightley, Bart., Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. W. A. May, Mr. C. Middleton, Mr. G. Norris Midwood, Mr. John Myatt, Mr. W. Nocton, Mr. R. G. Patterson, Mr. C. M. S. Pilkington, Mr. W. A. Prout, Mr. F. Reynard, Mr. C. Coltman Rogers, Mr. George Taylor, Mr. A. P. Turner, and Mr. C. W. Wilson.

The following Members of the Doncaster Local Committee were also present:—Mr. C. A. Chatterton, Mr. T. Harrison, Mr. John Law, Mr. C. D. Nicholson, Alderman G. Smith, Mr. G. B. C. Yarborough, Mr. R. A. H. Tovey (Town Clerk), and Mr. F. H. Chafer (Local Secretary).

The PRESIDENT, before proceeding with the ordinary business of the day, said it was with regret that he had to announce the death of the Very Rev. Dr. Gillespie, who had been a well-known figure in the agricultural world. In addition to holding high office in the Church of Scotland, Dr. Gillespie occupied

a prominent position on the Board of Directors of the Highland Society, and was a practical farmer of no mean attainments. He was, as they knew, Secretary of the Galloway Cattle Society, in the interests of which breed he had visited America some years ago, and on many occasions he had represented Scotland on Departmental Committees respecting agricultural matters. Alternately with Lord Moreton, he had been Chairman of the National Agricultural Examination Board, from its inauguration until 1910, and he had regularly attended at Leeds in connection with the Diploma Examination held there annually. Members of the Council would, his Lordship was sure, recall the Doctor's genial presence at the shows year after year, on which occasions they frequently had the opportunity of hearing him speak at the general meetings of members, when they were always sure of hearing something worth listening to, and also, in times of depression, something to raise their spirits. He felt sure it would be the wish of them all that they should send an expression of the Council's deep sympathy to the members of Dr. Gillespie's family in the irreparable loss they had sustained.

The minutes of the last meeting of the Council, held on January 31, 1912, were taken as read and approved.

The Right Hon. Walter Runciman, M.P., and Mr. Beville Stanier, M.P., were elected as Governors, and sixty duly nominated candidates were admitted into the Society as Members.

In the Report of the Committee of Selection it was stated that Sir Gilbert Greenall had received a letter from the Lord Mayor of Manchester, enclosing the following resolution passed at a meeting of the Manchester City Council on the 21st inst. :—

Resolved unanimously :

"That the Lord Mayor be requested, on behalf of the Council, to invite the Royal Agricultural Society of England to hold their meeting for 1916 in Manchester, and to convey the assurance to the Society that, so far as may be within the province and power of the Corporation, the Council will be glad to co-operate with any committee which may be appointed to secure the complete success of the meeting."

The Lord Mayor regretted that circumstances prevented his attending the Council Meeting of the Society to present the City's invitation personally, and had expressed the hope that Sir Gilbert Greenall would kindly act on his behalf. Sir Gilbert had explained to the Committee that for some time past suggestions had been made that Manchester would be pleased to invite the Society to pay them a visit, and, mainly owing to the good offices of Mr. G. Norris Midwood, these suggestions had been carried into effect. The Honorary Director further explained that Lord Egerton of Tatton had kindly placed at the disposal of the Manchester Corporation a most eligible site, which he had inspected, and which, having regard to its general excellence, he had no hesitation in accepting on behalf of the Society. In this connection Mr. John T. Smith, as Agent for Lord Egerton, had greatly interested himself in the arrangements which it is necessary to make with the tenants for the preparation of the land in anticipation of the Show of 1916. The Secretary had reported to the Committee that he had received from the Federation of Lancashire and Cheshire Agricultural Societies a Resolution in the following terms :—

"That the Federation of Lancashire and Cheshire Agricultural Societies hears with pleasure that the Lord Mayor and Corporation of Manchester have invited the Royal Agricultural Society of England to hold its annual Show at Manchester in 1916, and desires to support such invitation, and will assist in every way possible to secure the success of the Show, and that a copy of this Resolution be sent to (a) the Lord Mayor of Manchester, (b) the Secretary of the Royal Agricultural Society."

Sir GILBERT GREENALL, on behalf of the Lord Mayor of Manchester, then formally handed in the Resolution passed by the City Council, and begged to move :—

"That the invitation accorded by the City Council of Manchester, and forwarded by the Lord Mayor, for the Society to hold its Show in Manchester in 1916, be accepted, with the best thanks of the Society, and that the usual agreement with the Corporation be entered into in due course."

This motion was seconded by Mr. WILLIAM HARRISON, and unanimously agreed to.

Other business having been transacted, the Council adjourned until Wednesday, April 3, 1912.

WEDNESDAY, APRIL 3, 1912.

At a Monthly Council, held at 16 Bedford Square, W.C., Lord MIDDLETON (President) in the Chair :—

Present :—Trustees.—H.R.H. Prince Christian, K.G., Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Earl of Coventry, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Mr. Percy Crutchley, the Right Hon. Sir Ailwyn E. Fellowes, K.C.V.O., Sir Gilbert Greenall, Bart., C.V.O., the Hon. Cecil T. Parker.

Other Members of the Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Mr. H. Dent Brocklehurst, Mr. Davis Brown, Mr. Richardson Carr, the Hon. J. E. Cross, Mr. Howard Frank, Mr. W. T. Garne, Mr. J. W. Glover, Lord Harlech, Mr. Joseph Harris, Mr. W. Harrison, Sir A. G. Hazlerigg, Bart., Mr. Arthur Hiscock, Mr. R. W. Hobbs, Mr. J. Howard Howard, Mr. J. L. Luddington, Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. C. Middleton, Mr. H. Overman, Mr. W. A. Prout, Mr. F. Reynard, the Duke of Richmond and Gordon, K.G., Mr. C. Coltman Rogers, Mr. E. W. Stanyforth, Mr. C. W. Tindall, and Mr. L. C. Wrigley.

The following Members of the Doncaster Local Committee were also present :—Viscount Chetwynd, Mr. C. Thellusson, and Mr. F. H. Chafer (Local Secretary).

The minutes of the last meeting of the Council, held on February 28, 1912, were taken as read and approved.

Mr. C. S. Peirse-Duncombe, of Highlands, Minchinhampton, Stroud, and Sir Robert J. M. Walker, Bart., of Sand Hutton, York, were elected as Governors, and ninety-six duly nominated candidates were admitted into the Society as Members.

Sir JOHN THOROLD, on behalf of the Journal Committee, expressed regret that, through ill-health, Mr. Mackenzie had had to resign his position as Editor. Mr. C. S. Orwin had been very strongly recommended, and, after seeing him yesterday, the Committee had unanimously decided to recommend that his name be suggested to the Council for acceptance. He therefore begged to move "That Mr. Orwin be appointed as Editor of the Society's Journal." Mr. ADEANE having seconded the motion, it was unanimously adopted.

The Report of the Chemical and Woburn Committee was received and adopted. Sir J. B. BOWEN-JONES, in presenting this report, said that he ought perhaps to inform the Council that there was a probability of the Society receiving a grant of 600l. for their work at Woburn during the past year. A statement of the experiments that had been carried on there, and of the work generally, had been submitted to the Board of Agriculture, and the Committee were hoping that they would have a retrospective grant in this matter. The Council would have noticed from the report that, in accordance with the desire of the Board of Agriculture, the Committee had appointed a small deputation to meet the Board after the May Council meeting, to submit to them their proposals for the future. These had already been laid before the Development Commissioners, and probably the Board of Agriculture knew what they were ; but still, the Board wanted a communication to be made direct to them. The Committee therefore proposed to meet the officials of the Board of Agriculture on the day named, and to submit their proposals again. After hearing what they had to say, the Committee would again report to the Council.

The SECRETARY reported the death, since the last meeting of the Council, of Mr. W. Barrow Simonds, of Abbots Barton, Winchester, who joined the

Society in June, 1839, and was the sole surviving Foundation Life Governor. The Society had been represented at the funeral by Mr. James Falconer.

The Seal of the Society was ordered to be affixed to an agreement with the Refreshment Contractors in connection with the Show.

Other business having been transacted, the Council adjourned until Wednesday, May 8 next.

WEDNESDAY, MAY 8, 1912.

At a Monthly Council held at 16 Bedford Square. W.C., Lord MIDDLETON (President) in the chair :—

Present :—Trustees.—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Duke of Devonshire, Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, the Right Hon. Sir Ailwyn E. Fellowes, K.C.V.O., Sir Gilbert Greenall, Bart., C.V.O., the Earl of Yarborough.

Other Members of the Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Capt. Clive Behrens, Mr. H. Dent Brocklehurst, Mr. Davis Brown, Mr. Richardson Carr, the Hon. J. E. Cross, Mr. Joseph Harris, Sir A. G. Hazlerigg, Bart., Major H. G. Henderson, M.P., Mr. Arthur Hiscock, Mr. R. W. Hobbs, Sir C. V. Knightley, Bart., Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. W. A. May, Mr. C. Middleton, Mr. G. Norris Midwood, Mr. John Myatt, Mr. C. M. S. Pilkington, Mr. W. A. Prout, Mr. G. G. Rea, Mr. F. Reynard, Mr. C. Coltman Rogers, Mr. Fred Smith, Mr. H. H. Smith, Mr. E. W. Stanyforth, Mr. A. P. Turner, and Mr. E. V. V. Wheeler.

Governor.—Mr. W. F. Holt Beever.

The following Members of the Doncaster Local Committee were also present :—The Mayor of Doncaster, Viscount Chetwynd, Alderman G. Smith, Mr. R. A. H. Tovey, and Mr. F. H. Chafer (Local Secretary).

The minutes of the last meeting of the Council, held on April 3, 1912, were taken as read and approved.

Fifty-six duly nominated candidates were admitted into the Society as Members.

In presenting the Report of the Implement Committee—which contained a recommendation that the best thanks of the Society be accorded to Mr. C. D. Nicholson for the arrangements made by him for carrying out the Trials on his land at Stainton Manor—Mr. CORNWALLIS expressed on behalf of the Stewards of the Drill Trials their indebtedness to Mr. Nicholson for all the trouble he had taken to make things go smoothly. He entered willingly and heartily into all the arrangements, and he (Mr. Cornwallis) hoped that in accordance with the paragraph in the report, a suitable letter might be sent to Mr. Nicholson.

Sir JOHN THOROLD, in presenting the Report of the Committee of Selection, said he would like to move that the name of the Earl of Northbrook be submitted to the Members at the General Meeting in December for election as President for the year 1913. The Committee, he said, were unanimous in their choice, and he thought the Council would agree that they could not bring before them a better name. (Hear, hear.) It was a recommendation which he was sure would commend itself not only to all in that room, but also to the Members of the Society generally throughout the country.

Mr. ADEANE had great pleasure in seconding the proposal of Sir John Thorold. Lord Northbrook had very great qualifications for the post, as a breeder of Shorthorns, as a friend of Agriculture in all its aspects, and as a great supporter of the Society and a hard worker on the Council. He was sure they would be very glad to have him as their chief in 1913.

The PRESIDENT said he could only add that the suggestion of Lord Northbrook's name would be a most popular one, both there and throughout the country.

The resolution was thereupon unanimously adopted.

Lord NORTHBROOK begged to thank the Council most sincerely for the great honour they had done him in approving that his name should be submitted to the meeting in December for election as President of the Society for next year. The presidency of their Society was a position which any one who took an interest in the agriculture of the country must be proud to occupy, and he need hardly say that he gladly accepted nomination for that position. If elected, he could assure them that it would be his earnest endeavour to prove himself worthy of the confidence they had reposed in him, and to carry out the duties of the year to the satisfaction of Members of the Society. He was well aware that he could not hope to succeed without the co-operation and assistance of the Council, and he therefore begged them to continue to him that loyal support which they had invariably given to the occupant of the presidential chair.

The SECRETARY announced that the Trustees of the "Queen Victoria Gifts" Fund had decided to make a grant to the Royal Agricultural Benevolent Institution of 140*l.* for the year 1912, to be distributed as fourteen grants of 10*l.* each to the five male candidates, five married couples, and four female candidates who polled the largest number of votes in their class, and who would not this year receive grants from any other fund in connection with the Royal Agricultural Benevolent Institution.

After transacting other business, the Council adjourned until Wednesday, June 5, 1912.

WEDNESDAY, JUNE 5, 1912.

At a Monthly Council held at 16 Bedford Square, W.C., the Right Hon. Sir AILWYN E. FELLOWES, K.C.V.O. (Vice-President) in the Chair:—

Present:—*Trustees*—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Earl of Coventry, Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, Sir Gilbert Greenall, Bart., C.V.O., the Hon. C. T. Parker, the Earl of Yarborough.

Other Members of the Council.—Mr. D. T. Alexander. Capt. Clive Behrens, Mr. E. W. Betts, Mr. H. Dent Brocklehurst, Maj.-Gen. J. F. Brocklehurst, C.V.O., C.B., Mr. Davis Brown, Mr. Richardson Carr, Mr. J. Falconer, Mr. Howard Frank, Mr. W. T. Garne, Lord Harlech, Mr. Joseph Harris, Lord Hastings, Sir A. G. Hazlerigg, Bart., Mr. J. H. Hine, Mr. Arthur Hiscock, Mr. R. W. Hobbs, Mr. W. F. Ingram, Mr. J. L. Luddington, Mr. Alfred Mansell, Mr. W. A. May, Mr. C. Middleton, Mr. W. Nocton, Mr. R. G. Patterson, Mr. W. A. Prout, Mr. F. Reynard, the Duke of Richmond and Gordon, K.G., Mr. C. Colman Rogers, Mr. George Taylor, and Mr. L. C. Wrigley.

The following Members of the Doncaster Local Committee were also present:—The Mayor of Doncaster, Viscount Chetwynd, Mr. C. A. Chatterton, Mr. T. Harrison, Mr. John Law, Alderman G. Smith, Mr. C. Thellusson, Mr. R. A. H. Tovey, Mr. G. B. C. Yarborough, and Mr. F. H. Chafer (Local Secretary).

In the unavoidable absence of the President (Lord Middleton), the Right Hon. Sir Ailwyn E. Fellowes, K.C.V.O. (Vice-President) was called to the Chair.

The minutes of the last meeting of the Council, held on Wednesday, May 8, 1912, were taken as read and approved.

Capt. Clive Behrens, Mr. Hugh Morrison, and Mr. Frederick Reynard were elected as Governors, and 130 duly nominated candidates were admitted into the Society as Members.

The Report of the Finance Committee was received and adopted; and, on the motion of Mr. ADEANE, it was resolved: "That the Secretary be empowered to issue to any duly nominated candidate for membership of the Society, on receipt of the annual subscription, a badge admitting the candidate to the same

privileges as a Member during the forthcoming Show, the formal election of such candidate to be considered by the Council at their next ordinary meeting."

The Report of the General Doncaster Committee having been received and adopted, the CHAIRMAN announced that a telegram had been received from Lord Middleton intimating that H.R.H. Prince Arthur of Connaught would visit the Doncaster Show on Wednesday, July 3.

Mr. ADEANE called attention to the increase in the number of outbreaks of anthrax and swine fever for the present year, in comparison with the corresponding period of 1911, which he thought they would all agree was very unsatisfactory. He had not had an opportunity of reading the whole of the report of the Departmental Committee which had sat on Foot-and-Mouth Disease—of which Sir Ailwyn Fellowes was Chairman, and on which there were two other Members of the Council, but he had seen some of the conclusions arrived at, and they seemed to him exceedingly practical. He was sure that Committee ought to be congratulated on having done their work so expeditiously and reported so quickly. He would like to move that the report of this Departmental Committee be issued to Members of the Council, together with copies of the interim report of the Departmental Committee which had inquired into Swine Fever. The Foot-and-Mouth Disease Committee had not only gone into that disease, but had also considered the question of anthrax, for the reason that the same measures which would be preventive in the one case would be preventive in the other. With these reports before them, the Council might, at a subsequent meeting, have a discussion concerning them. He thought it would not tend to make their proceedings less lively if occasionally they had discussions on questions of this kind, which were of such great interest to the agriculturists of the country. This suggestion was adopted. Sir AILWYN FELLOWES remarked that he thought he might say, on behalf of the Foot-and-Mouth Disease Committee, that they had felt the absolute importance of getting through their work as speedily as possible, consistent with efficiency, for the purpose of allaying the uneasiness felt in the country as regards the outbreaks of the disease. He hoped and trusted that, when considered by the agricultural world, that report would be received with satisfaction. He felt that the Council should take some steps on reports of this kind, because they could consider them very carefully, and he was sure that any consideration given to these reports would be acceptable to the Board of Agriculture.

Other business having been transacted, the Council adjourned until Thursday, July 4, in the Doncaster Showyard.

TUESDAY, JULY 2, 1912.

At a Special Council held in the Showyard at Doncaster, Lord MIDDLETON (President) in the Chair:—

Present:—Trustees.—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Earl of Coventry, Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, the Right Hon. Sir Ailwyn Fellowes, K.C.V.O., Mr. R. M. Greaves, Sir Gilbert Greenall, Bart., C.V.O., the Hon. C. T. Parker.

Other Members of the Council.—Mr. T. A. Buttar, Mr. R. G. Carden, Mr. Joseph Harris, Mr. J. H. Hine, Mr. J. L. Luddington, Mr. Alfred Mansell, Mr. G. Norris Midwood, Mr. W. Nocton, Mr. C. M. S. Pilkington, Mr. G. G. Rea, Mr. F. Reynard, Mr. E. W. Stanyforth, and Mr. E. V. V. Wheeler.

The PRESIDENT opened the proceedings by explaining that in view of recent events connected with the outbreaks of Foot-and-Mouth Disease, he had decided to call the Council together at the earliest possible moment to consider the position of affairs. He then called upon Sir Gilbert Greenall (the Honorary Director) to explain what had been done,

Sir GILBERT GREENALL mentioned in detail all that had occurred in connection with the Order of the Board of Agriculture prohibiting the holding of the show of cattle, sheep, and pigs. On Sunday night a long telegram had been received which necessitated prompt action, and as a result he had thought it necessary to advise the men in charge of the stock to ascertain from their employers whether they desired to have their exhibits returned home or to leave them in the Showyard. On Monday morning, however, a further telegram was received stating that circumstances had arisen which made it necessary for the Board of Agriculture to prohibit the holding of the show of cattle, sheep, and pigs. He thereupon arranged with the Railway Companies for the immediate removal of the exhibits in these sections. The result was that the Railway Companies at once made preparations for the removal of the stock, working day and night, so that when the public reached the Showyard that morning there were only a very few of the animals, other than horses, left in the yard.

On the motion of Sir J. B. BOWEN-JONES, Bart., the action of the Honorary Director was unanimously approved.

The PRESIDENT said he had received a telegram from Mr. Runciman expressing regret that circumstances had compelled him to issue the Order prohibiting the exhibition of cattle, sheep, and pigs, and stating that the position as regards Foot-and-Mouth Disease was so serious that he felt it incumbent upon him to act as he had done. He felt, however, that the Society would support him in the action he had taken.

The Council unanimously requested Lord Middleton to communicate with the President of the Board of Agriculture, explaining that they fully realised the seriousness of the situation, and thoroughly supported his action.

Mr. ADEANE reported that at a meeting of the Finance Committee held earlier that day, it had been decided to recommend that the Council should return the entry fees to the Exhibitors of the stock that had been excluded, and also refund to the Breed Societies the grants made by them to the prize-list. He stated that it was a matter for congratulation to the Society that they were in a sufficiently sound financial position to be able to take this course.

The recommendation of the Finance Committee having been adopted, the meeting terminated.

THURSDAY, JULY 4, 1912.

At a Monthly Council held in the Showyard, at Doncaster, Lord MIDDLETON.
(President) in the Chair:—

Present:—Trustees.—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis. Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, Mr. R. M. Greaves, Sir Gilbert Greenall, Bart., C.V.O., the Hon. C. T. Parker.

Other Members of the Council.—Capt. Clive Behrens, Mr. T. A. Buttar, Mr. R. G. Carden, the Hon. J. E. Cross, Mr. J. Falconer, Mr. W. T. Garne, Mr. Joseph Harris, Mr. J. H. Hine, Mr. J. Howard Howard, Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. C. Middleton, Mr. G. Norris Midwood, Mr. J. Myatt, Mr. W. Nocton, Mr. Henry Overman, Mr. C. M. S. Pilkington, Mr. W. A. Prout, Mr. G. G. Rea, Mr. F. Reynard, Mr. John Rowell, Mr. F. Smith, and Mr. C. W. Wilson.

The following Members of the Doncaster Local Committee were also present:—Mr. C. A. Chatterton, Mr. John Law, and Mr. F. H. Chafer (Local Secretary).

The minutes of the last monthly meeting of the Council held on June 5, and of the Special Council held in the Doncaster Showyard on Tuesday, July 2, were taken as read and approved.

On the recommendation of the Finance Committee accounts amounting in all to 1,559*l.* 11*s.* 5*d.* were passed for payment.

A Report from the Implement Committee with regard to the Trials of Milking Machines which are to be carried out by the Society in 1913 was received and adopted.

The SECRETARY read a letter from Mr. Kenneth Goschen, of Eastcote, an exhibitor, stating that as the Order of the Board of Agriculture prohibiting the holding of the live stock portion of the Show was bound to cause great loss to the Society, he had much pleasure in enclosing a cheque for 5*l.* as a contribution towards that loss. He further asked that the entry fees he had paid should be placed to the credit of the general fund.

On the motion of the PRESIDENT it was unanimously decided that a letter should be sent to Mr. Goschen conveying to him the Society's best thanks for his liberality.

Lord MIDDLETON intimated that he would return his fees to the Society; he believed Sir Gilbert Greenall would do the same, and he hoped that others would follow suit.

It was resolved, on the motion of Sir JOHN THOROLD, Bart., seconded by the Hon. CECIL T. PARKER, "That the best thanks of the Society are due and are hereby tendered to:—

- (a) The Officials of the General Post Office for the efficient postal and telegraphic arrangements.
- (b) The Chief Commissioner of Police for the efficient service rendered by the detachment of Metropolitan Police on duty in the Showyard.
- (c) The Chief Constable of Doncaster for the efficient police arrangements in connection with the Show.
- (d) The Denaby Main (Rotherham) Brigade of the St. John Ambulance Association for the efficient Ambulance arrangements.
- (e) Messrs. Beckett & Co., Bankers, for the efficient services rendered by their officials.
- (f) Messrs. Shand, Mason & Co., for the provision of Fire Engines and for the efficient arrangements in connection with the Fire Station in the Showyard.
- (g) Messrs. Postlethwaite & Stacey, for decorating and furnishing the Royal Pavilion.
- (h) Messrs. Pennell & Co., for providing the Floral Decorations near the Pavilions, &c.
- (i) Messrs. Marshall, Sons & Co., Gainsborough, for the loan of a Steam Engine for supplying Motive Power to the Dairy."

Letters of thanks were ordered to be addressed to all the exhibitors in the Agricultural, Education and Forestry Exhibitions, and to various firms and individuals who had rendered assistance in connection with the Show.

Other business having been transacted, the Council adjourned until Wednesday, July 31, 1912, at 16 Bedford Square, W.C.

Proceedings at General Meeting of Governors and Members,

HELD IN THE
LARGE TENT IN THE SHOWYARD AT DONCASTER.

THURSDAY, JULY 4, 1912.

LORD MIDDLETON (PRESIDENT) IN THE CHAIR.

Amongst those present were the Earl of Northbrook, the Hon. J. E. Cross, the Hon. C. T. Parker, Sir J. B. Bowen-Jones, Bart., Sir Richard P. Cooper, Bart., Sir Gilbert Greenall, Bart., C.V.O., Sir John Thorold, Bart., Mr. D. T. Alexander, Capt. Clive Behrens, Mr. Richardson Carr, Mr. W. W. Chapman, Mr. F. S. W. Cornwallis, Mr. Percy Crutchley, Mr. L. A. Dashwood, Mr. Henry Dudding, Mr. James Falconer, Mr. W. T. Garne, Mr. A. K. Gibson, Mr. R. M. Greaves, Mr. Edward Owen Greening, Mr. Henry Hawking, Mr. J. H. Hine, Mr.

J. Howard Howard, Mr. W. F. Ingram, Mr. Alfred Mansell, Mr. George Marshall, Mr. Ernest Mathews, Mr. John Manghan, Mr. Christopher Middleton, Mr. G. Norris Midwood, Mr. Charles Morris, Mr. John Myatt, Mr. William Nocton, Mr. Henry Overman, Mr. Claude M. S. Pilkington, Mr. W. A. Prout, Mr. G. G. Rea, Mr. Frederick Reynard, Mr. Charles Coltman Rogers, Mr. Fred Smith, Mr. H. Smith, jun., Mr. L. C. Tipper, Mr. James Watt, Mr. C. W. Wilson, &c., &c.

The following representatives of the Doncaster Local Committee also attended: Mr. C. A. Chatterton, Mr. John Law, and Mr. F. H. Chafer (Local Secretary).

Foot-and-Mouth Disease.

The PRESIDENT, in opening the meeting, said they met together that day under, perhaps, the most remarkable circumstances that had occurred in the history of the Society—he referred to the closing of that section of the Show comprising cattle, sheep, and pigs in consequence of the outbreaks of Foot-and-Mouth Disease. In these outbreaks immediate and stringent steps had to be taken, and the Council, at a special meeting which they held on the opening day of the Show, unanimously approved of the course taken by the Board of Agriculture. It was the best and the only course that could have been taken under the circumstances.

He felt, too, that they ought to take some notice of the prompt manner in which Sir Gilbert Greenall and those who assisted him had dealt with the situation. They had done everything they could to help forward the removal of the stock from the Showyard. It had been a difficult matter to get so large a number of animals out of the Showyard in so short a time, and he thought the railway companies, backed up by the efforts of Sir Gilbert, had done everything they could do for the Society and exhibitors. (Hear, hear.)

Entry Fees to be Returned.

The Council met on Tuesday as soon as possible, and at that meeting it had been decided to return the entry fees of exhibitors whose stock could not be shown. He thought this would meet with the approval of the Members, and in this connection he read the following letter:—

Sigers,
Eastcote, Middlesex.

DEAR SIR.—As the order prohibiting the holding of the live stock portion of the Doncaster Show is bound to cause a great loss to the Society, I have much pleasure in enclosing a cheque for 5*l.* as a small contribution towards that loss.

Please also place my entry of stock fees and auction fees to the credit of the general fund. (This in case such fees are returnable.)

I remain,

Yours truly,

(Signed) KENNETH GOSCHEN.

The Secretary, R.A.S.E.

The PRESIDENT, continuing, said he would not think of asking to have returned the fees he had paid for his stock, neither, he believed, would Sir Gilbert Greenall, and he had no doubt that other exhibitors would help in that way. (Hear, hear.)

Co-operation of Local Societies.

There was another thing he would like to allude to, and that was the help the Yorkshire Agricultural Society and the Doncaster Agricultural Society had given them. Some of those present would remember that many years ago when the Royal Agricultural Society's Show was last in Yorkshire there was a great boom in agricultural shows, and it was thought that the "Royal" could be held as well as the County Show. They had, however, found that the experiment was not expedient. On the present occasion the Yorkshire Society determined to forego their Show, and the Doncaster Society did the same. While on this subject he would like to mention that Mr. John Manghan, the Secretary, and Mr. Henry Hawking, the Director of the Yorkshire Agricultural Society, with Mr. Yarborough, had been chiefly instrumental in bringing about this result.

Considering all the circumstances, he thought that they had a very excellent Show, and perhaps, as Yorkshiremen should, they had kept in the Showyard the chief exhibits—the horses. Every Yorkshireman liked a horse, and he believed that every man who could would come to see the show of horses. And he had no doubt that there would be a good attendance from that day until Saturday.

Then, this year, they had a novelty in the shape of a show of Terriers, which he was sure would also appeal to Yorkshiremen.

The misfortune they had suffered should, he thought, be a warning to them. Fault was sometimes found by people who asked why the Society did not spend some of their reserve fund. He thought that all that had happened only showed that the policy they were pursuing was right, and that, dependent as they were so largely on the weather and other conditions, it was essential that they should keep a substantial reserve fund at their backs. (Applause.)

Just another word. Although cattle, sheep and pigs were missing, of late years they had added to the exhibition many what might be called "side shows," and the present occasion afforded an excellent opportunity for visitors to improve their minds by inspecting the educational sections. Going round on the previous day with Prince Arthur of Connaught they both found these most interesting, more especially the Forestry, Horticultural and Educational exhibitions, and the display of Australian products. He was sure they were all delighted to have Prince Arthur in their midst. His Royal Highness had been so much in Yorkshire that he was known to many, and he knew many of them also. He was most appreciative of everything he saw, and had made the remark that "the Royal Agricultural Show was the greatest show in the world." (Applause.)

Prizes for Yorkshire Farms.

The SECRETARY then read the awards of the Judges in the competition for the best managed farms in Yorkshire. (See page lxxxv.)

Plantation and Nurseries.

Mr. McROW also read out the awards of the Judges of Plantations and Home Nurseries in Yorkshire. (See pp. lxxxvi and lxxxvii.)

Thanks to Mayor and Corporation.

The Earl of NORTHBROOK moved "That the best thanks of the Society are due and are hereby tendered to the Mayor and Corporation of Doncaster for their cordial reception of the Society." From the inception of the Show until its opening that week the Society had received the greatest assistance from the Mayor and Corporation. They had worked in the most cordial co-operation with the Honorary Director in all matters connected with the Show, and the Society were more than grateful for the help they had received. Especially did they desire to thank the Mayor (Councillor Clark), for he had never spared himself in doing everything in his power to promote the success of their undertaking, and they desired to acknowledge the constant courtesy and hospitality which he and the Corporation had extended to them during their visit.

Sir JOHN THOROLD begged to second the vote of thanks proposed by Lord Northbrook. As one who had been present on the occasion of the Show at Doncaster in 1891 he could testify to the great improvement that had taken place both in the town and in the show ground. He could also bear testimony to the great help the Society had received from the members of the Corporation with the Mayor at its head.

The resolution was then put to the meeting, and unanimously agreed to.

Thanks to Local Committee.

Sir GILBERT GREENALL said that once again it was his very pleasant privilege to propose a resolution thanking the Local Committee for the

tremendous amount of work, time, and trouble they had given in their endeavour to make the show the success they knew it would have been, but for the unforeseen and unavoidable circumstances, of which they were all aware. He was sure that every member of the Council and of the Society felt that they owed a deep debt of gratitude to the Doncaster Local Committee, for all they had done, and it was therefore with very great pleasure that he proposed: "That the best thanks of the Society are due, and are hereby tendered, to the Doncaster Local Committee, for their exertions to promote the success of the Show." While mentioning the Local Committee, he did not think he ought to leave out the Town Clerk (Mr. Tovey), and Mr. F. H. Chafer (the Local Secretary) whose father had acted in a similar capacity when the Show was held there twenty-one years ago. They had given of their best to the work of the Society, and they all felt greatly indebted to them for what they had done.

Mr. FREDERICK REYNARD cordially endorsed all that had been said by Sir Gilbert Greenall, and had great pleasure in seconding the resolution, which was then passed unanimously.

Railway Companies thanked.

Mr. F. S. W. CORNWALLIS, in proposing a resolution of thanks to the railway companies, said the President had already testified to the exceptional difficulties which the companies had had to contend with this year. That meeting, he was certain, would heartily endorse what had been said in that respect. The railway people had successfully dealt with the new problems that had arisen, and he was sure the thanks of them all were due to the companies concerned.

Mr. J. HOWARD HOWARD said that if ever the railways deserved a vote of thanks it was on that occasion. He thought the way in which they handled, within twenty-four hours, that enormous traffic of cattle, sheep, and pigs, and despatched them within the day was perfectly prodigious, and a marvel of organisation. If those present went beyond that, and could realize that within the next ten days there would scarcely be a ton of machinery left in the showground, he thought they would agree with him that it was marvellous. He had great pleasure in seconding the resolution, which was carried unanimously.

Suggestions of Members.

The PRESIDENT then inquired if any Governor or Member had any remarks to make, or suggestions to offer for the consideration of the Council.

Mr. EDWARD OWEN GREENING, as one of the oldest Members of the Society, expressed "from the ranks" a word of sympathy with the Council in a complication of difficulties that he had not known during the half-century he had followed the interests of the Society. They ought to be grateful to the Council, he said, for the wisdom that had built up a great reserve fund ready for an emergency of this kind. If there should, unhappily, be a deficit on the Show, they would meet it with certainty and courage. The Society was able to stand an occasional loss of this kind, for it was never better equipped for its great work, and there never was a time when greater opportunities for work lay before it. Mr. Greening suggested that, following the example of the International Horse Show at Olympia, the Society should introduce Bending and other competitions for Polo ponies as a feature that would interest the public.

The PRESIDENT said he had no doubt the Council would take Mr. Greening's suggestion into consideration.

Mr. LAWRENCE C. TIPPER (Birmingham), referring to the action taken by the Board of Agriculture and the Council of the Society in connection with the outbreak of Foot-and-Mouth Disease, said that he and, he thought, most of them were entirely in accord with that action. Unfortunately, he had had to do with the last outbreak of "Cattle Plague" under the Privy Council, and

knew what that was. He asked the Press, however, to make it clear that the recent outbreaks of Foot-and-Mouth Disease were not "Cattle Plague" at all. The statements which appeared in some of the newspapers created a false impression. Those who had had to return their animals home at considerable expense had done so for the good of the nation, and that being so the nation should refund them out-of-pocket expenses. He knew of exhibitors who had looked to this Show almost to pay their rents. (Hear, hear.) He had seen the statement of the President of the Board of Agriculture in Parliament on the previous night; but he still thought that if some pressure were brought he might agree to this suggestion. It would not be a large sum, because many of the exhibitors would not ask to be recouped; but there were a considerable number to whom it would be a great boon to have, not only their entry fees returned, but their out-of-pocket expenses refunded.

The PRESIDENT replied that this suggestion could be referred to the Council; that was all he could say at present.

A MEMBER drew attention to what he termed the inefficient catering, and asked why, when the Society went to Yorkshire, they did not employ a Yorkshire caterer.

Mr. CHARLES MORRIS, of St. Albans, asked the Council to consider whether it would be practicable to have in this country a Quarantine Station in which, in the event of such an outbreak as the present one, animals could be kept for a reasonable time. Many owners of cattle, he remarked, brought their animals to the Show in the hope of meeting foreign buyers.

The PRESIDENT answered that other societies had considered this question, but the Council would bear it in mind at the proper time.

Mr. HENRY SMITH, jun. (Cropwell Butler), asked the Council to reconsider the wool classification. Years ago each breed had a separate class, but now the longwools and shortwools were massed together. He suggested that the old classification be reverted to.

The PRESIDENT replied that this suggestion would be considered by the Committee that had charge of the matter.

Thanks to President.

Mr. JAMES WATT, Carlisle, proposed a vote of thanks to Lord Middleton for his services in the chair. Most agriculturists, he thought, and, in fact, all right-thinking people in the Empire, would regret the statement Mr. Runciman had made in the House of Commons on the previous night with regard to recouping the Royal Agricultural Society and the intending exhibitors. With such resources behind him—the Development Act to begin with, and his friend and colleague, the Chancellor of the Exchequer—(laughter)—who would draw at least three millions in one year from that most valuable and estimable class of people, the poor maid servant—(renewed laughter)—he thought the least he could do was to recognise the great value this Society had been to agriculture, and to say they should not be liable for—should he call it an act of God or the act of the Irishmen? (Loud laughter.) At any rate, this question ought to be taken up by the Government.

Mr. HENRY HAWKING (Easingwold), in seconding the vote of thanks, referred to Lord Middleton's efforts for the benefit of agriculture, adding that if Great Britain were sought over no abler President could be found.

The SECRETARY then submitted the motion, which was enthusiastically carried.

LORD MIDDLETON, in acknowledging the vote, thanked Mr. Watt and Mr. Hawking for their kind words. When he had been asked to accept the Presidency for this year, he had felt rather doubtful about accepting, as he thought they might have got somebody else in Yorkshire, but on reflection he had decided to accept and do his best. He could tell those present that it was a great honour to be asked to act a second time, and he had done all he could to make the Show this year a success. As to what he had done for the agriculture of

the country he thought it his duty, and that of every man who farmed, to make it as good as he could. He thanked them again for their kind expressions, and hoped that the Show—although there had been a certain amount of failure to start with—might in the end prove as good or even better than was expected.

The proceedings then terminated.

WEDNESDAY, JULY 31, 1912.

At a Monthly Council, held at 16 Bedford Square, W.C., Lord MIDDLETON (President) in the Chair :—

Present :—Trustees.—Sir J. B. Bowen-Jones, Bart., Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, Mr. J. Marshall Dugdale, the Right Hon. Sir A. E. Fellowes, K.C.V.O., Mr. R. M. Greaves, Sir Gilbert Greenall, Bart., C.V.O., the Earl of Yarborough.

Other Members of the Council.—Mr. T. L. Aveling, Mr. H. Dent Brocklehurst, Mr. H. Dudding, Mr. J. T. C. Eadie, Mr. J. Falconer, Mr. Howard Frank, Mr. W. T. Garne, Mr. W. Harrison, Sir A. G. Hazlerigg, Bart., Mr. R. W. Hobbs, Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. W. A. May, Mr. C. Middleton, Mr. C. M. S. Pilkington, Mr. W. A. Prout, Mr. F. Reynard, Mr. Fred Smith, Mr. H. Herbert Smith, Mr. E. W. Stanyforth, and Mr. E. V. V. Wheeler.

The minutes of the last monthly meeting of the Council, held in the Doncaster Showyard, on July 4, 1912, were taken as read and approved.

The Hon. James Dunsmuir, of Victoria, British Columbia, was elected a Governor, and seventy-six duly nominated candidates were admitted into the Society as Members.

Mr. ADEANE, in presenting the Report of the Finance Committee, which was received and adopted, announced that the financial results of the Doncaster Show, though he did not know them exactly, would not show such a loss as some of them anticipated. The Council had been met on this occasion, as they were on all occasions, with the greatest generosity on all sides, and on the previous day the Finance Committee had had before them a list of donations from exhibitors amounting to 119%. He was quite sure that the Council, and the whole Society, would be very grateful to those exhibitors who were meeting them in this way.

On the motion of Mr. ADEANE, seconded by Sir JOHN THOROLD, Bart., it was resolved : "That in order to facilitate the winding up of the accounts for the Doncaster Show as early as possible, authority be given for the issue, during the recess, of orders on the Society's bankers for the payment of accounts connected with the Show."

A deputation from Nottingham in support of an invitation to hold the Show in that city, in the year 1915, was introduced by Mr. PILKINGTON. The deputation consisted of The Mayor (Mr. Councillor E. Mellor), Mr. Alderman Ball, the Town Clerk (Mr. W. J. Board), Mr. Bertram Smith (President of the Nottinghamshire Agricultural Society), Mr. Councillor C. J. Mee (honorary secretary of the Nottinghamshire Horticultural Society), and Mr. Alderman Heath, representing the Farmers' Union. The invitation having been formally tendered by the MAYOR, and speeches having been made by various other members of the deputation, the Council unanimously resolved, on the motion of the PRESIDENT, that the invitation be accepted.

Lord NORTHBROOK, in presenting the report of the Veterinary Committee, said he would like to refer very briefly to the paragraph as to the appointment of the Sub-Committee. The Veterinary Committee thought that it was desirable that fuller consideration should be given to matters relating to the prevalence of certain diseases of animals in the country, the best method of dealing with and controlling them, and other matters which affected the interests of stock owners. The Committee believed that such a course would

be advantageous to the Society, and they also hoped that it might be helpful to the Board of Agriculture. The Council by this means would be in a position to make representations to the Board on these subjects, and to support the Board in any action they might think necessary in dealing with these questions. The Veterinary Committee, at their regular monthly meetings, had not sufficient time to go into questions like this, and that Committee was such a large one that it was too much to ask the members to come together more often than they did now. The Committee therefore suggested the appointment of a Sub-Committee for this purpose. The gentlemen whose names had been read out had agreed to serve on the Sub-Committee, and were, he believed, willing to give a good deal of time and consideration to these matters, to consulting and obtaining information from experienced and practical persons, and making investigations with a view to reporting to that Committee. The PRESIDENT expressed the opinion that the proposed Sub-Committee would be most useful. He thought the Board of Agriculture would be willing to take the Society's opinion on several things and that members of the Society in the country looked to the Council to take a forward part in looking after the diseases of animals.

The Report of the Stock Prizes Committee having been received and adopted, Mr. REYNARD said he was sure the Council had been very gratified to hear the statement made by the Chairman of the Finance Committee that the loss on the Doncaster Show would not be as much as was anticipated. Speaking for the Stock Prizes Committee, he might say that they very much appreciated the action of those exhibitors who had foregone their entry fees and sent contributions, and he ventured to hope that others would be willing to follow their generous example.

The Reports of the Implement, Showyard Works, Selection, Dairy and Produce, Farm Prizes and Horticultural Committees were received and adopted.

The SECRETARY read a letter from Mr. Edward Brown, President of the International Association of Poultry Instructors and Investigators, conveying a resolution passed at the final session of the Association's meeting, tendering their profound gratitude to the Society for granting them the privilege of using for their meetings the rooms at the Society's house, 16 Bedford Square.

After the transaction of other business, the Council adjourned over the autumn recess, until Wednesday, November 6, 1912.

TUESDAY, OCTOBER 8, 1912.

A Special Meeting of the Council was held at 16 Bedford Square, W.C., to discuss the situation in connection with the recent Orders of the Board of Agriculture, respecting the admission of Live Stock into Great Britain. In the unavoidable absence of Lord Middleton (President), the Right Hon. SIR AILWYN E. FELLOWES, K.C.V.O. (Vice-President), was called to the Chair.

Present:—Trustees.—The Earl of Coventry, the Earl of Northbrook.

Vice-Presidents.—Mr. C. R. W. Adeane, Sir Richard Cooper, Bart., the Hon. Cecil T. Parker.

Other Members of the Council.—Capt. Clive Behrens, Mr. Richardson Carr, Mr. Howard Frank, Mr. Arthur Hiscock, Mr. R. W. Hobbs, Mr. W. F. Ingram, Mr. W. A. May, Mr. C. Middleton, Mr. H. F. Plumptre, Mr. F. Reynard.

Governor.—The Rt. Hon. Henry Chaplin, M.P.

The CHAIRMAN, in his opening remarks, explained that the President—who was unable to be present that day—had suggested in the previous week that a special meeting of the Council should be convened for the purpose of looking into the question of the regulations of Foot-and-Mouth Disease between England and Ireland. A resolution had been drawn up, which would be moved and seconded, and he thought it would be carried unanimously. Many Members of the Council who were unable to be present had written saying that they heartily approved of the action taken by the Royal, and what was especially pleasing to him was that the four Members of Council from his own

County of Norfolk were absolutely in favour of the prohibition of Irish store cattle.

Mr. ADEANE felt sure they all regretted that they could not that day carry out their original intention, which was that they should meet to give their hearty support to the President of the Board of Agriculture in the firm attitude he had taken up with regard to the admission of Irish cattle into Great Britain. The whole position had been changed, and he feared they must all of them express their very strong disapproval of the action of Mr. Runciman. What they really met for that day was to do what they could to resist the demands which were constantly being urged on the Board of Agriculture from Ireland. As the premier Society of England, their duty was to do all they could to avert the danger to the cattle of the country. The disease should receive drastic treatment, and no loopholes should be left for the re-introduction of the disease into Great Britain. He begged to move the following resolution:—

"That while desiring to express their approval of the action taken by the Board of Agriculture, whereby the importation into Great Britain of Irish cattle was prohibited, the Council of the Royal Agricultural Society of England desire to place on record their regret at the action of the President of the Board of Agriculture in admitting Irish store cattle into this country at a time when cases of Foot-and-Mouth Disease are reported from different districts in Ireland, thus opening the door to the re-introduction of disease from Ireland into Great Britain. They would urge upon him most strongly in the interests, not only of the breeders and stock owners of this country, but of consumers, that the regulations lately existing should be re-imposed until such a time as Ireland is free from the disease."

The EARL OF NORTHBROOK, as Chairman of the Veterinary Committee, seconded the resolution.

Speeches in support of the motion having also been made by Mr. RICHARDSON CARR, Mr. FREDERICK REYNARD, Mr. CHRISTOPHER MIDDLETON, Mr. ROBERT W. HOBBS, and Captain CLIVE BEHRENS, the resolution was put to the meeting and carried unanimously.

Copies of the resolution were ordered to be sent to the various Agricultural and Breed Societies.

On the motion of the Hon. CECIL PARKER, seconded by Mr. CHRISTOPHER MIDDLETON, it was resolved:—

"That the Society join in the deputation to be received by the President of the Board of Agriculture on Wednesday next, to present the resolution passed at this meeting."

The Right Hon. HENRY CHAPLIN, M.P. (Governor), said he was unfeignedly glad that the Council had passed the resolution in the sense they had done, because he came there that day for the sole purpose of asking their permission to say at the deputation on the following day that he had the high authority of the Council's sanction and support for the statement he proposed to make to Mr. Runciman in the hope, and for the purpose laid down in their resolution, that it might be possible, even yet, to secure some modification of the Order, and some postponement of its action—at all events for a certain time.

WEDNESDAY, NOVEMBER 6, 1912.

At a Monthly Council held at 16 Bedford Square, W.C., Lord MIDDLETON (President) in the Chair:—

Present:—Trustees.—Sir J. B. Bowen-Jones, Bart., the Earl of Coventry, the Earl of Northbrook.

Vice-Presidents.—Mr. Percy Crutchley, the Right Hon. Sir A. E. Fellowes, K.C.V.O., Sir Gilbert Greenall, Bart., C.V.O.

Other Members of the Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Mr. E. W. Betts, Mr. H. Dent Brocklehurst, Mr. Davis Brown, Mr. T. A. Buttar,

Mr. Richardson Carr, the Hon. J. E. Cross, Mr. H. Dudding, Mr. J. T. C. Eadie, Mr. A. E. Evans, Mr. J. Falconer, Mr. Howard Frank, Mr. W. T. Garne, Mr. J. W. Glover, Lord Harlech, Mr. W. Harrison, Mr. J. H. Hine, Mr. Arthur Hiscock, Mr. R. W. Hobbs, Mr. W. F. Ingram, Sir C. V. Knightley, Bart., Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. W. A. May, Mr. C. Middleton, Mr. G. Norris Midwood, Mr. John Myatt, Mr. Henry Overman, Mr. R. G. Patterson, Mr. C. M. S. Pilkington, Mr. H. F. Plumptre, Mr. W. A. Prout, Mr. F. Reynard, Mr. C. C. Rogers, Mr. John Rowell, Mr. H. Herbert Smith, Mr. E. W. Stanyforth, Mr. C. W. Tindall, Mr. A. P. Turner, Mr. E. V. V. Wheeler, and Mr. L. C. Wrigley.

Governor.—Mr. Harold Swithinbank.

The following Members of the Bristol Local Committee attended the meeting of the General Bristol Committee on the previous afternoon:—Mr. Peter Addie (City Valuer), Mr. Henry Bridgman, Mr. R. E. Bush (Sheriff of Bristol), Mr. J. J. Harle, Alderman C. A. Hayes, Mr. Sidney Humphries, Mr. Samuel Kidner, Mr. James Peter, Mr. H. L. Riseley, Mr. Edmund J. Taylor (Town Clerk), Mr. Eldred G. F. Walker, Mr. H. W. Seccombe Wills, and Mr. George Nichols (Hon. Local Secretary).

The minutes of the last ordinary meeting of the Council, held on Wednesday, July 31, and of the special Council held on Tuesday, October 8, were taken as read and confirmed.

Mr. Frederick E. Muntz, of Umberslade, Hockley Heath, was elected a Governor, and ninety-two duly nominated candidates were admitted into the Society as Members.

The PRESIDENT announced with sincere regret the deaths, since the Council last met, of Mr. George Taylor, Mr. William Scoby, and Mr. Alfred J. Smith. Mr. George Taylor was the Member of Council for the County of Middlesex, which division he had represented since 1905, and he was known to most of those present as being connected with the breeding of Shorthorns and especially Dairy Shorthorns. His presence amongst them would be greatly missed. Mr. William Scoby had also been well known, particularly in his Lordship's own part of the country. Everybody looked up to him, and he was greatly honoured there. Mr. Alfred Smith, who died recently at the age of seventy-seven, had been a Member of that Council for over twenty years. He would be remembered for his kindly manner to everybody, and as a breeder of Suffolk Cart-horses. His Lordship said it would doubtless be the wish of the meeting that an expression of the Council's regret should be sent to each of the bereaved families.

Sir GILBERT GREENALL said the Council would remember that at the meeting in February last, he had had the honour to hand to his Lordship a letter from the Lord Mayor of Manchester containing an invitation for the Society to hold its annual Show in the city of Manchester in the year 1916. On that occasion the Council unanimously accepted the written invitation, and he now had the pleasure to state that he had been in communication with the Lord Mayor of Manchester, with a result that a deputation from the city and county were present personally to offer the Society a most hearty welcome to Lancashire. Mr. HARRISON then introduced the deputation, which was composed of:—The Lord Mayor of Manchester (Mr. Councillor S. W. Royse), Sir George W. Agnew, Bart., M.P., Sir William Bailey, Sir Charles Behrens, Alderman Edward Holt, Mr. Harold Agnew, Mr. J. T. Smith, Mr. Thomas Hudson (Town Clerk), Mr. M. Birtwistle, Mr. J. Herbert Hall, and Mr. J. H. Thewlis.

The LORD MAYOR OF MANCHESTER, Sir CHARLES BEHRENS, Alderman EDWARD HOLT, and Sir WILLIAM BAILEY having spoken in support of the invitation, the PRESIDENT thanked the deputation for their attendance. He was sure Sir Gilbert Greenall would do everything he could to make the Show at Manchester a great success; all they wanted was the weather and the attendance would be as good as they could expect.

Mr. D. T. ALEXANDER introduced a deputation from Cardiff to tender to the Society a cordial invitation to visit that City in the year 1917. The deputation consisted of the Lord Mayor of Cardiff (Sir J. W. Courtis), the Town Clerk of Cardiff (Mr. J. L. Wheatley), Lord Ninian Crichton Stuart, M.P., Lord Aberdare, Mr. E. W. M. Corbett (Lord Bute's Agent), Alderman C. H. Bird, Mr. G. P. Mitchell Innes, Mr. Iltyd Thomas, Mr. Edward Akers (Chairman of the Agricultural Council for the district), Mr. R. Templeton (the tenant of the land), and Mr. Hubert Alexander (Secretary of the Glamorgan Chamber of Agriculture). Speeches in support of the invitation were made by THE LORD MAYOR OF CARDIFF, LORD NINIAN CRICHTON STUART, LORD ABERDARE, MR. MITCHELL INNES, MR. CORBETT, and MR. D. T. ALEXANDER.

On the motion of the PRESIDENT, seconded by Sir GILBERT GREENALL, it was unanimously resolved :

"That the Royal Agricultural Society accept the invitation of Cardiff, to hold the Show in that City in the year 1917, subject to the customary agreement being entered into with the Society by the Corporation."

Sir J. B. BOWEN-JONES, in presenting the report of the Chemical and Woburn Committee, announced officially the resignation of Mr. Hogg, the Manager of the Woburn Experimental Station. Mr. Hogg had been in the service of the Society for eleven years, and, while they were sorry to lose his services, he thought the Council would all congratulate him on his new appointment, and wish him every success in his future life. Mr. Frank C. Atkinson, B.Sc., had been appointed in place of Mr. Hogg. There had been 199 applications received in time and one had come in yesterday morning, making 200. The half-dozen selected candidates had been asked to attend the meeting of the Chemical and Woburn Committee and the choice of that Committee, as stated in the Report, fell upon Mr. Atkinson, who had had the very highest recommendations from practical as well as scientific people.

Mr. MATHEWS, in presenting the Report of the Dairy and Produce Committee, which was adopted, drew attention to the offer made by the Glamorgan County Council of prizes for butter-making, in the hope that the other County Councils included in the area of the Competition might see their way to follow this example and offer special prizes. In calling attention to the paragraph with regard to wool, and the offer of the Southdown Sheep Society to provide prizes for a class for Southdown wool at the Bristol Show, he stated that a letter had been received that morning from the Kent or Romney Marsh Sheep Breeders' Association offering to provide prizes for a class for Kent wool.

The SECRETARY read the following letter, which had been received from the Secretary of the Yorkshire Agricultural Society, dated October 8, 1912 :—

MY DEAR MCROW,

I am directed by the Council to express on their behalf all due thanks to the Council of the Royal Agricultural Society for the manner in which members of this Society were treated at the Doncaster Show.

It is very gratifying that the connection between the two Societies has been most satisfactory.

Yours sincerely,

(Signed) J. MAUGHAN.

The Secretary,
The Royal Agricultural Society.

On the motion of the PRESIDENT, the Seal of the Society was affixed to the agreement between the Society and the Corporation of Bristol in connection with the holding of the Show of 1913.

The Report of the Council to the Annual General Meeting of Governors and Members, to be held at the Royal Agricultural Hall, Islington, at 3 p.m. on Wednesday, December 11, was prepared and ordered to be issued.

Other business having been transacted, the Council adjourned until Wednesday, December 11, at 11 a.m.

WEDNESDAY, DECEMBER 11, 1912.

At a Monthly Council held at 16 Bedford Square, W.C., Lord MIDDLETON (President) in the Chair :—

Present:—*Trustees*.—Sir J. B. Bowen-Jones, Bart., Mr. F. S. W. Cornwallis, the Earl of Coventry, the Duke of Devonshire, Lord Moreton, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. R. W. Adeane, Sir Richard P. Cooper, Bart., Mr. Percy Crutchley, Mr. J. Marshall Dugdale, the Right Hon. Sir A. E. Fellowes, K.C.V.O., Mr. R. M. Greaves, Sir Gilbert Greenall, Bart., C.V.O., the Hon. C. T. Parker, the Earl of Yarborough.

Other Members of the Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Captain Clive Behrens, Mr. E. W. Betts, Mr. Henry Dent Brocklehurst, Mr. Davis Brown, Mr. T. A. Buttar, Mr. Arthur E. Evans, Mr. Howard Frank, Mr. W. T. Garne, Mr. Joseph Harris, Lord Hastings, Major H. G. Henderson, M.P., Mr. J. H. Hine, Mr. R. W. Hobbs, Mr. W. J. Hosken, Mr. W. F. Ingram, Mr. G. R. Lane-Fox, M.P., Mr. J. L. Luddington, Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. W. A. May, Mr. C. Middleton, Mr. G. Norris Midwood, Mr. T. H. Miller, Mr. John Myatt, Mr. Henry Overman, Mr. C. M. S. Pilkington, Mr. H. F. Plumptre, Mr. W. A. Prout, Mr. G. G. Rea, Mr. F. Reynard, the Duke of Richmond and Gordon, K.G., Mr. C. C. Rogers, Mr. Fred Smith, Mr. E. W. Stanyforth, Mr. C. W. Tindall, Mr. A. P. Turner, Mr. E. V. V. Wheeler, and Mr. Louis C. Wrigley.

The following Members of the Bristol Local Committee attended the meeting of the General Bristol Committee :—Mr. Peter Addie, Mr. H. Bridgman, Mr. J. J. Harle, Mr. H. L. Riseley, Mr. H. W. Seccombe Wills, and Mr. George Nichols (Hon. Local Secretary).

The minutes of the last Meeting of the Council, held on Wednesday, November 6th, 1912, were taken as read and approved.

The PRESIDENT said it was his melancholy duty to report the death, a few days ago, of one of their colleagues, Mr. Henry Dudding, a representative on the Council for the Division of Lincolnshire. Mr. Dudding became a Member of the Society in 1870, and joined the Council in 1906. He was a very noted and successful breeder and exhibitor of Shorthorn cattle and Lincoln sheep, and animals from his herds and flocks had in the past been much sought after by foreign buyers. His Lordship had also to announce the death of Sir Charles Whitehead, who joined the Society so far back as 1857, and served on that Council for no less than thirty-eight years, retiring in 1907 through failing health. Sir Charles was frequently a steward at the Royal Shows, and for many years carried out the duties of Chairman of the Botanical Committee. He also contributed many valuable articles to the Journal.

The Report of the Finance Committee was received and adopted; and Mr. ADEANE, Chairman, presented the accounts for the Show at Doncaster. These showed a loss of 1,232*l.*, which was amply covered by the contribution of 2,500*l.* from the ordinary account to the Show account. If from that sum of 2,500*l.* they deducted the loss of 1,232*l.*, it gave a balance to their credit of 1,268*l.*

In presenting the Report of the Chemical Committee, Sir J. B. BOWEN-JONES said that, although they might have had to wait a long time for it, a reply had now been received to the application made by the Society for a grant to enable them to conduct their experimental work at the Woburn Farm. This question had given the Chemical Committee a good deal of anxiety, and although the hope had been deferred for a long while, they felt that they had had some compensation in the fact that an interim grant had been made for the purposes of their work, with a promise of something more. The Committee wanted more definite information as to what the position would be in future, and until a reply to the Society's inquiry had been received, the Committee were unable to announce what the final decision would be.

Lord NORTHBROOK referred to two questions mentioned in the Report of the Veterinary Committee, dealing with Swine Fever and with Foot-and-Mouth

Disease. Resolutions, he said, would presently be submitted to the Council, and Members who might wish to make any remarks on these subjects would have an opportunity of doing so. The Council would notice that the Committee recommended that the report of the Principal of the Royal Veterinary College should be published in the next volume of the Journal. That was the usual course. As, however, this report contained much valuable information as to recent experiments with regard to the treatment of contagious abortion of cattle, and particularly as to a method of testing animals for this disease, which had been employed with very successful results in a number of herds, he suggested that the report be circulated amongst Members of the Council forthwith, as well as being included in the Journal, which would not be published until March next.

On the motion of Mr. ALFRED MANSELL, seconded by Mr. E. W. STANYFORTH, the following resolution was passed :—

"That a copy of the Report for 1912 of the Principal of the Royal Veterinary College in reference to Swine Fever be sent to the Board of Agriculture with a communication stating that the Council are strongly of opinion that the drastic measures that Sir John McFadyen recommends should be carried out in every case."

Sir AILWYN FELLOWES then moved, Mr. DENT BROCKLEHURST seconded, and it was resolved :—

"That a letter be sent to the Board of Agriculture, urging them to give effect to the recommendations of their own Departmental Committee on Foot-and-Mouth Disease with the least possible delay."

In presenting the Stock Prizes Committee's Report, Mr. REYNARD said that the amount voted for prizes by the Finance Committee was 6,000*l.*, and this had been all allocated. It was pleasing to note that the Society continued to receive the generous support of the Breed Societies, and it was gratifying to find that their contributions for the Bristol Show were in excess of those offered at the late Doncaster Show. He thought it was a matter for congratulation that they continued to receive this cordial co-operation, which was so much to the benefit of both the Royal and the Breed Societies. Several private individuals had again contributed most generously to the prize sheet, and, although they preferred to remain anonymous, yet the Society's thanks were, nevertheless, due to them.

A suggestion made by the Hon. CECIL PARKER and Mr. STANYFORTH, that the Annual General Meeting should in future be held at a more convenient hour, was referred for consideration to the Committee of Selection.

The Duke of DEVONSHIRE (Chairman of the Special Committee) presented the report of the Referees (Dr. William Somerville and Professor Wood) appointed in connection with the Society's offer of its gold medal for original research in agriculture. Five essays had been submitted to the Referees, and they recommended that the gold medal be awarded to Mr. William Gavin, B.A., for his paper on the "Interpretation of Milk Records."

In accordance with the regulations governing the award of the medal, Mr. Gavin was elected a Life Member of the Society.

The Duke of DEVONSHIRE, in moving the adoption of this report, said he hoped the Council would be of opinion that the experiment of presenting the gold medal had been justified by the results. The report which they had received from Dr. Somerville and Professor Wood gave the fullest possible information on the subject, and he thought that the Council were fully justified in carrying the experiment still further. He would like to express his congratulations to Mr. Gavin on being the first winner of this medal, and he would also like to take the opportunity of thanking Dr. Somerville and Professor Wood for their trouble in going through the papers and making the award.

The SECRETARY read the following resolution, which had been passed at the General Meeting of the Yorkshire Agricultural Society :—

"The members of the Yorkshire Agricultural Society wish to express to the Council of the Royal Agricultural Society of England their appreciation of the

manner in which the conditions upon which this Society voluntarily offered not to hold a Show in the year 1912 were carried out.

"They much regret that the unfortunate outbreak of Foot-and-Mouth Disease in Ireland, and the restrictions on the movement of stock, except horses, which were necessarily enforced resulted in the Doncaster Show not being the success there is every reason to suppose it otherwise would have been."

A letter was also read from the Secretary of the Doncaster Agricultural Society stating that at the Annual Meeting of that Society he had been desired to express, on their behalf, their appreciation of the generous manner in which the members of the local Society had been treated by the Royal Agricultural Society on the occasion of the Doncaster Show.

The following Standing Committees were appointed for 1913:—Finance, Journal and Education, Chemical and Woburn, Botanical and Zoological, Veterinary, Stock Prizes, Implement, Showyard Works, Selection, Dairy and Produce, and Special. The present members of the various Standing Committees were, with one or two exceptions, reappointed to those Committees. Lord Strachie was added to the Botanical and Zoological and Veterinary Committees, Mr. G. R. Lane-Fox, M.P., to the Botanical and Zoological and Showyard Works Committees, Mr. A. W. Perkin to the Chemical and Woburn Committee, Mr. Davis Brown to the Stock Prizes Committee, Mr. E. V. V. Wheeler, Mr. T. L. Aveling, and Mr. Joseph Harris to the Committee of Selection.

On a motion from the Chair, the Seal of the Society was affixed to the Agreement in connection with the Society's tenancy of the Charity Farm at Woburn.

Other business having been transacted, the Council adjourned until Wednesday, February 5, 1913.

Proceedings at the Annual General Meeting of Governors and Members,

HELD AT THE ROYAL AGRICULTURAL HALL, ISLINGTON,

WEDNESDAY, DECEMBER 11, 1912.

LORD MIDDLETON (PRESIDENT) IN THE CHAIR.

Present:—*Trustees.*—Mr. F. S. W. Cornwallis, the Earl of Northbrook, Sir John H. Thorold, Bart.

Vice-Presidents.—Mr. C. R. W. Adeane, the Right Hon. Sir A. E. Fellowes, K.C.V.O., Mr. R. M. Greaves.

Other Members of Council.—Mr. D. T. Alexander, Mr. T. L. Aveling, Mr. E. W. Betts, Mr. Davis Brown, Mr. James Falconer, Mr. J. W. Glover, Lord Hastings, Mr. J. H. Hine, Mr. R. W. Hobbs, Mr. W. J. Hosken, Mr. W. F. Ingram, Mr. J. L. Luddington, Mr. Alfred Mansell, Mr. Ernest Mathews, Mr. Claude M. S. Pilkington, Mr. G. G. Rea, Mr. Frederick Reynard, Mr. C. W. Tindall, Mr. A. P. Turner, and Mr. E. V. V. Wheeler.

Honorary Member.—Sir Thomas H. Elliott, K.C.B.

Governors.—Lieut.-Col. J. F. Curtis-Hayward, Mr. Frederick Ernest Muntz, Mr. Beville Stanier, M.P., Mr. Martin J. Sutton.

Members.—Mr. John Alexander, Mr. W. W. Baylis, Mr. J. L. Beck, Mr. John J. Bell, Mr. Thomas Blackwell, Mr. F. J. Casserley, Mr. J. Chalcraft, Mr. W. S. Cleverley, Mr. J. E. Cooke, Mr. Thomas Corbett, Mr. William Cory, Mr. G. Loyd Courthope, M.P., Major P. G. Craigie, C.B., Mr. H. S. Daine, Mr. J. L. Daniell, Mr. A. W. Dean, Mr. L. de Wyttenbach, Mr. John Evens, Mr. William Fortune, Mr. Henry Walter Gilbey, Mr. F. L. Gooch, Mr. Edward Grasett, Mr. J. E. Grove, Mr. C. Y. Hewitt, Mr. T. A. Huband, Mr. Clement Keevil, Mr. Dunbar Kelly, Mr. W. G. Laue, Mr. William Langridge, the Rev. Cecil H. Legard, Mr. C. W.

Le May, Mr. Llewellyn T. E. Llewellyn, Professor W. McCracken, Mr. Kenneth J. J. Mackenzie, Mr. Archibald McNeilage, Mr. Joseph Martin, Mr. Henry Matthews, Mr. C. Morris, Mr. Thomas Nesbitt, Mr. T. G. Owen, Mr. Benjamin Painter, Mr. P. J. Parmiter, Professor John Penberthy, Mr. Edward C. Ransome, Mr. R. Henry Rew, C.B., Mr. J. A. Robinson, Mr. St. John B. Roscoe, the Rev. H. M. Rowdon, Mr. Aubrey Rumball, Mr. C. Franklin Simmons, Mr. E. C. Simon, Mr. James Slatter, Mr. Richard Stratton, Mr. Daniel Swaffer, Mr. Alfred Tanner, Mr. J. Herbert Taylor, Mr. George D. Thody, Mr. C. D. Thompson, Mr. E. Trimmen, Col. F. A. Walker-Jones, Mr. E. Watson, Mr. J. W. Watt, Mr. Jonas M. Webb, Mr. W. F. Wood, Mr. N. W. Wortley, &c.

Officers.—Dr. J. Augustus Voelcker, Consulting Chemist ; Mr. Thomas McRow, Secretary.

President's Opening Remarks.

The PRESIDENT, in opening the proceedings, said that, in the first place, he should like, on behalf of the Society, to acknowledge the courtesy of the Royal Agricultural Hall Company and the Smithfield Club in allowing them to hold the meeting in that room, and thus giving an opportunity for so many Members to be present. The past year had been a somewhat eventful one in the agricultural world, and especially for the Society.

Doncaster Show.

The outbreaks of Foot-and-Mouth Disease, commencing at the end of last June, had the very serious effect of causing the Society to abandon the cattle, sheep and pig portions of the Show, and this caused great disappointment to a large number of exhibitors and others. However, in spite of this, the Show was loyally supported by the people of Yorkshire, and the result was much more satisfactory than could have been anticipated. In this connection he would like to say how much they were indebted to the Mayor and Corporation of Doncaster, the Race Committee, and the Local Executive Committee. Then, again, they had the great advantage of the very cordial co-operation of both the Yorkshire Agricultural Society and the Doncaster Agricultural Society, which bodies both gave up their shows in favour of the Royal. Once more they had to acknowledge the great services rendered to the Society by their Honorary Director, Sir Gilbert Greenall. (Hear, hear.) During the time of stress at Doncaster, he left no stone unturned in his efforts to do everything possible for the convenience, not only of exhibitors, but also of the herdsmen and attendants, who naturally were most anxious as to what was really going to happen. Most unfortunately, Sir Gilbert was unable to be with them that day, having been called away on important business.

The first item on the agenda was the presentation of the balance-sheet, and those present all had in their hands the accounts for this year's Show, which, as he had said, could but be regarded as satisfactory, bearing in mind all the circumstances.

Report.

It would be noticed from the Report of the Council, which the Members also had before them, that during the past year the Society had lost by death a good many of its supporters, and he much regretted that there had now to be added to the list given in the report, the names of Mr. Henry Dudding and Sir Charles Whitehead. Mr. Henry Dudding joined the Society as a Member in 1870, and in 1906 was elected to the Council as a representative of the Division of Lincolnshire. Mr. Dudding was, he thought, known to almost all of them as a most successful breeder and exhibitor of Shorthorns and Lincoln sheep. The late Sir Charles Whitehead, who resigned his position as a Vice-President in 1907, was elected a Member in 1857, and he had served on the Council for no less than thirty-eight years. Sir Charles acted on several occasions as a steward at the Show, and for a number of years filled the position of Chairman of the Botanical and Zoological Committee. He had also written some valuable papers for the Society's Journal.

Prizes at Bristol.

Turning again to the Report, the PRESIDENT said there was every indication of a successful exhibition next year at Bristol. (Hear, hear.) The Breed Societies had again been very generous in their support, and the prizes for all classes of stock, &c., would be on a liberal scale. He might say that the total amount offered in prizes would be nearly 11,000*l*. The Lord Mayor and Corporation and the Local Committee of Bristol were most enthusiastic with regard to next year's Show, and were doing everything they could to assist the Society, so that if the weather was favourable success seemed to be assured.

Future Shows.

Another matter he desired to refer to was the fact that the Council, in response to very cordial invitations from the respective localities, had accepted invitations for the holding of the Shows for the next five years, namely, next year at Bristol, in 1914 at Shrewsbury, 1915 at Nottingham, 1916 at Manchester, and 1917 at Cardiff. (Applause.)

Gold Medal for Research.

There was just one other matter before he sat down. As was stated in the Report last year, it had been decided to offer the Society's gold medal for original research in agriculture. The entries for the first year closed last Michaelmas, and of the five papers submitted, that sent in by Mr. William Gavin, B.A., on "The Interpretation of Milk Records," had been selected by the referees as the most meritorious work, and, consequently, he had to announce that Mr. Gavin had been awarded the Society's gold medal.

Adoption of Report.

Mr. MARTIN J. SUTTON (Reading) said he was only informed as he came into the room that he was to have the honour to move the adoption of the Report. He had very hastily glanced through it—he had previously read it—and marked certain clauses, all but two of which had been referred to by the Chairman, so that there was very little for him to say. He did not think they could pass Clause 7, however, without congratulating themselves that when they did lose the eminently useful services of their present Chairman, they were to be favoured with the help of the Earl of Northbrook. Nothing could be more satisfactory. With regard to what had been said about the annual Exhibition at Doncaster, of course that Show was in their minds, and they could not forget the calamity that seemed to be before them on the Monday of the week of the Show. He could not help remembering, on arriving at the station, seeing cattle going back from the Showground. He had never seen it before. The pouring rain in which they were travelling back, and the terrible depression of everyone connected with the Show, made that first day one to be remembered. None of them had seen such a thing before, or would wish to again. Certainly he would never forget it. And then to think that they pulled through notwithstanding that. Yorkshiremen and others came to their help, and though they could not see the cattle, they could see the horses, in which the Yorkshiremen are so interested. Everybody determined that, so far as in them lay, the Show should be a success, notwithstanding the calamity which befell them in consequence of the outbreak of Foot-and-Mouth Disease. They were very grateful to Prince Arthur of Connaught for coming under such circumstances, and there was no doubt at all that the Royal Show owed a very great debt to the Royal Family, for wherever the Society went, some member of the Royal Family was sure to be with them. The President had already referred to the satisfaction they all felt, not only in having such a splendid site and such a splendid centre for the Show next year at Bristol, but in having had promises from Shrewsbury, Nottingham, Manchester and Cardiff to follow. His experience of the Society during the twenty-two years he had been a Member of the Council was that never before had they had such a succession of great places

willing to receive them. That implied that the Royal Society's peregrinating Shows were not played out by any means. He thought they should congratulate themselves on the action taken by the Council in connection with Foot-and-Mouth Disease. On page 12 of the Report they were reminded that the Council had taken a very prominent part in urging upon the Government the necessity of restrictions being still enforced and not relaxed, and bearing in mind the great temptation there was to the Government to relax those restrictions, he thought they ought to be more grateful, not only to the Council, for the action they had taken, but to Mr. Runciman for making such a decided answer to the Irishmen when they needed to be reminded that we were the controlling party.

He (the speaker) had the honour still to represent the Society on their National Diploma Examination Board, and he thought they would all agree with him that when they saw such a large number of successful candidates, not only for the Diploma in Agriculture, but also for the Diploma in Dairying, they must consider that they were as a Society doing good work, and that the Report therefore merited the approval of the meeting. He had the very greatest pleasure in proposing its adoption.

Major P. G. CRAIGIE, C.B. (Lympstone, Devon), seconded with pleasure the resolution which Mr. Sutton had proposed. On many occasions he had met his fellow Members of that great Society at that meeting, and looking back over nearly half a century of membership of the Society, he did not remember that they had had within the terms of that Report a more vivid picture of the activities of the old Society than they had that day. Not only was the Society identified with that great function of the year, the Show, to which Mr. Sutton had referred, but they might congratulate themselves that, in spite of all their difficulties, they still held aloft the good standard of work in the Chemical, Experimental, Botanical, Zoological, and Veterinary Departments of the Society. To all of those who believed that the great agricultural societies were first of all really educational bodies, striving to promote the agriculture of the country, it must be a source of the greatest gratification that, under such chairmanship as they had, and under the guidance of their able officials, the Royal Agricultural Society, in good times and bad, had done so well as the Report testified. No further words from him were necessary to second the motion, which he did very cordially.

The Report was then adopted.

Election of President.

Professor JOHN PENBERTHY (Newnham, Glos.) esteemed it a great honour to be invited to propose the resolution, and it was a particular privilege that he had in the resolution to bring before their notice a name which he was sure would commend itself to their most favourable consideration and hearty support. It was his privilege to propose that the Earl of Northbrook be elected President of the Society to hold office until the next ensuing annual general meeting. Good wine needed no bush, and it was not necessary to use words in commending the resolution. Lord Northbrook's name was too well known to need commendation. His Lordship's interest in agriculture was second to none, and, having had the honour of being associated with him in many agricultural projects, he could with great assurance refer to the success attending those operations, which success had been largely due to the personality of the nobleman, who he was quite sure they would honour themselves by electing their President. He begged to propose the resolution.

Mr. LLEWELLYN T. E. LLEWELLYN (Basingstoke) begged to second the resolution, and had very great pleasure in doing so. He had to do with a Committee of which, he believed, his Lordship was Chairman, and a more delightful Committee to work with he did not know, and the reason was largely that his Lordship was Chairman of it.

The resolution was carried by acclamation.

The Earl of NORTHBROOK, whose rising was greeted with great applause, thanked the Members very sincerely for the honour they had done him in electing him their President for the ensuing year, and he also thanked his friends, Professor Penberthy and Mr. Llewellyn, for their kind words in proposing and seconding his election. Since he had been a Member of the Council he had taken a great interest in the work of the Society, and the position as President was one which he highly valued as the greatest honour that could be conferred upon a Member of the Society. He could assure them that it would be his endeavour to carry out to the best of his ability the responsible duties connected with the office to which they had so kindly elected him that day, and as he knew that he would have the assistance of an able staff and could rely on having the loyal support of the Council, he hoped that he would succeed in doing so to their satisfaction, and in a manner worthy of the Society. He thanked them very much for the confidence they had been so good as to express in him that day.

Election of Trustees.

The PRESIDENT stated that the following twelve Trustees had been nominated by the Council in accordance with the by-laws, and on a show of hands they were duly elected :—

H.R.H. Prince Christian, K.G., Cumberland Lodge, Windsor.
Bedford, Duke of, K.G., Woburn Abbey, Bedfordshire.
Bowen-Jones, Sir J. B., Bart., Council House Court, Shrewsbury.
Cornwallis, F. S. W., Linton Park, Maidstone, Kent.
Coventry, Earl of, Croome Court, Severn Stoke, Worcestershire.
Devonshire, Duke of, G.C.V.O., Chatsworth, Chesterfield.
Gilbey, Sir Walter, Bart., Elsenham Hall, Elsenham, Essex.
Jersey, Earl of, G.C.B., G.C.M.G., Middleton Park, Bicester.
Middleton, Lord, Birdsall House, Malton, Yorks.
Moreton, Lord, Sarsden House, Chipping Norton, Oxon.
Northbrook, Earl of, Stratton, Micheldever, Hampshire.
Thorold, Sir John H., Bart., Old Hall, Syston, Grantham.

Election of Vice-Presidents.

The Vice-Presidents were elected in a similar manner, their names being as follows :—

Adeane, C. R. W., Babraham Hall, Cambridge.
Cooper, Sir Richard P., Bart., Shenstone Court, Lichfield.
Crutchley, Percy, Sunninghill Lodge, Ascot, Berkshire.
Derby, Earl of, G.C.V.O., C.B., Knowsley, Prescott, Lancashire.
Dugdale, J. Marshall, Llwyn, Llanfyllin, S.O., Mont.
Fellowes, Right Hon. Sir Ailwyn E., K.C.V.O., Honingham, Norwich.
Feversham, Earl of, Duncombe Park, Helmsley, Yorkshire.
Greaves, R. M., Wern, Portmadoc, North Wales.
Greenall, Sir Gilbert, Bart., C.V.O., Walton Hall, Warrington.
Northumberland, Duke of, K.G., Alnwick Castle, Northumberland.
Parker, Hon. Cecil T., The Grove, Corsham, Wiltshire.
Yarborough, Earl of, Brocklesby Park, Lincolnshire.

Elections to the Council.

The PRESIDENT then announced, in accordance with By-law 87, the names of the following Ordinary Members of Council who had been elected to represent the several Divisions of the Society included in Group "C," in order that the meeting might "take cognizance of their election" :—

Alexander, D. T., Bryneithen, Dinas Powis, Glamorganshire.
Aveling, Thomas L., Boley Hill House, Rochester, Kent.
Brocklehurst, Henry Dent, Sudeley Castle, Winchcombe, Gloucestershire.
Carden, Richard George, Fishmoyne, Templemore, co. Tipperary, Ireland.
Evans, Arthur E., Bronwylla, Wrexham, North Wales.
Garne, W. T., Aldsworth, Northleach, Gloucestershire.
Glover, James W., Beechwood, Warwick, Warwickshire.
Harris, Joseph, Brackenbrough Tower, Carlisle, Cumberland.
Henderson, Major H. G., M.P., Kitemore, Farington, Berkshire.
Hobbs, Robert W., Kelmscott, Lechlade, Oxfordshire.
Ingram, Walter F., 2 St. Andrew's Place, Lewes, Sussex.

*Lane-Fox, George R., M.P., Bramham Park, Boston Spa, Yorks. W. Riding.
 Luddington, J. L., Littleport, Ely, Cambridgeshire.
 †Perkin, A. W., Greenford Green, Harrow, Middlesex.
 Plumptre, H. Fitzwalter, Goodnestone, near Canterbury, Kent.
 Reynard, Frederick, Sunderlandwick, Driffield, Yorkshire, East Riding.
 Richmond and Gordon, Duke of, K.G., Goodwood, Chichester, Sussex.
 Rowell, John, Bury, Huntingdon, Huntingdonshire.
 Strachie, Lord, Sutton Court, Pensford, Somerset.
 Tindall, C. W., Wainfleet, S.O., Lincolnshire.
 Wilson, Christopher W., Rigmaden Park, Kirkby Lonsdale, Westmorland.

*Additional Member elected under By-law 83.

†Member elected under By-law 89.

Election of Auditors.

Mr. HENRY WALTER GILBEY proposed that the best thanks of the Society be tendered to Mr. Jonas M. Webb, Mr. Hubert J. Greenwood, and Mr. Newell P. Squarey for their services as auditors during the past year, and that they be re-elected. It required no words from him to get those present to re-elect the gentlemen named for the ensuing year.

Mr. A. TANNER having seconded the motion, it was unanimously carried.

Suggestions of Members.

In response to the customary inquiry from the Chair as to "whether any Governor or Member of the Society had any remarks to make or suggestions to offer for the consideration of the Council,"

Mr. J. E. COOKE (Acton Beauchamp) suggested for the consideration of the Council that it would be better if the Journal could be published earlier than at the present time. The Show was held in the summer, and they did not get the Journal until some time in the year following, and he thought it would be much better to have at an earlier date the reports of the various competitions.

Mr. THOMAS A. HUBAND referred to the question of Swine Fever in the country. They knew that a great deal had been done, but he thought that a great deal more might be done, particularly through the Council of the Society, in urging the Minister of Agriculture to take such steps as would be more satisfactory to the community. They once had a Minister of Agriculture who was brave enough to tackle the question of rabies, and he received—and would always deserve—the gratitude of the whole country. They were all aware, he had no doubt, that the position of things with regard to Swine Fever was very much worse in the present year than it had been for a very long time past. There was a passage in the report saying that Foot-and-Mouth Disease was the most serious consideration there was throughout the year in regard to contagious diseases, but he thought they would all agree that the position with regard to swine plague was very much worse, and very much more important to the community than that of Foot-and-Mouth Disease. (Cries of "No.") He hoped that the Council would give a little more attention to it, and take steps to induce the Board of Agriculture to take such measures as were recommended by their best advisers, so that they might be as successful with swine plague as they had been with regard to other diseases.

The PRESIDENT asked Lord Northbrook, the Chairman of the Veterinary Committee, to reply to Mr. Huband.

Lord NORTHBROOK thought he might say, in the first place, they all agreed with Mr. Huband as to the exceedingly unsatisfactory condition of the country with regard to Swine Fever. He could assure him that the matter had the constant attention of the Council, and also of its Veterinary Committee. The Council had only that morning passed a resolution, which was to be forwarded to the Board of Agriculture, pointing out what they considered might be more effective steps in dealing with the matter, and urging the Board to take them into consideration with a view of giving effect to them. The Veterinary Sub-Committee had appointed a Sub-Committee, who were inquiring very fully into the matter, and receiving evidence from gentlemen in various parts of the country, and that Sub-Committee (of which he had the honour to be Chairman)

hoped, and it was only a hope, that they might be able to throw some light on these difficulties, and give some assistance to the Board in the matter. He assured Mr. Huband that the matter had not been lost sight of by the Society.

The PRESIDENT, in answer to Mr. Cooke, said that the next Volume would be issued in March, but that the suggestion that had been made would be referred to the Journal Committee.

Mr. C. W. LE MAY (Croydon) begged to call attention to the fact that England was the only civilised country in the world that had not a Seed Testing Station. The seed trade of the United Kingdom had taken steps to try to get one in this country, but the President of the Board of Agriculture had not done anything. They had approached the Council, and asked them if they would use their influence, and at a meeting held on Monday night he understood that the Seed Trade Association thought that the Council of the Royal Agricultural Society gave it their favourable consideration, but they wanted the seed trade to contribute towards it. The Association maintained that it should be started by the Government, and would soon be self-supporting. It would be a great advantage to traders, seed merchants and all farmers to be able to send samples of seeds, have them tested, get value for their money, and get good seeds. He really thought the Society might take some steps in the matter to bring pressure to bear on the Board of Agriculture.

The CHAIRMAN said that this question would be referred to the Council.

Thanks to the retiring President.

Sir THOMAS ELLIOTT, K.C.B., was sure that it would be the unanimous desire of every Member present to express to Lord Middleton their grateful thanks for his services as President of the Society during the past year. (Hear, hear.) They all knew that during his year of office he had displayed and exemplified in his own person some of the very best qualities which distinguished true agriculturists—loyalty, good sense, tolerance, and public spirit had all been shown by Lord Middleton during his term of office in a most conspicuous fashion. From some points of view they could wish that Lord Middleton's term of office had been more prosperous, happy and successful than it had been. They also remembered that in the time of trouble and difficulty a Society like theirs needed to be well led, and it was fortunate for the Society that during the time they had great difficulties to contend with Lord Middleton should have been President. Both at the Board of Agriculture and the Royal Agricultural Society they had had many bitter experiences in the past year. There had been a bright side, for it had brought out the loyalty, hard work, and devotion of his colleagues on the Board of Agriculture in a marked fashion. There was not a man there who had not devoted himself, when necessary, day and night, Sundays and weekdays, to get rid of the scourge. The bright side showed them the loyalty and goodwill of all the agriculturists of the country, small and large, in the troubles they had had to contend with. He remembered very well the outbreaks in 1892, his first year at the Board of Agriculture, when hardly an hour passed without the arrival of deputations of farmers asking that the restrictions might be withdrawn, and saying that the remedy was worse than the disease. They had had nothing of the kind this year. There had been the general support of agriculturists, and the measures taken to get rid of the disease had been supported by the Council of the Society, and not the least by its President, Lord Middleton. He asked them cordially to express their thanks to Lord Middleton for his conduct in the chair.

Mr. G. L. COURTHOPE, M.P., had very great pleasure in seconding the vote of thanks moved by Sir Thomas Elliott. The steering of great organisations like "the Royal" through all the difficulties that must necessarily arise even in a year when all was smooth and easy, was a considerable task, and one that deserved the gratitude of every one concerned. To do so as Lord Middleton had done that year in a time of difficulties and disappointments, not only without disaster, but with conspicuous success, deserved, he thought, the tenfold gratitude of the

agricultural community. No words were necessary to commend the proposal to the Members, and as his Lordship, with his well-known modesty, could not very well put the resolution to them himself, he, Mr. Courthope, asked them to express their approval.

The resolution was passed by acclamation.

Lord MIDDLETON, in reply, thanked the meeting for their vote. He considered it last year, when he was elected, a great honour to have been appointed to represent that great Society a second time. They would remember that the first time he occupied the Presidential Chair he had not had a very successful time of it. That was in the year 1904-5, and they would remember the troubles they were in, and the difficulties they had to get over. Time had put things right, and now he thought the Society was in a very prosperous state. He could not say that it was owing to him, but others who came after him at that time did an enormous amount for the Society then, and year by year the state of the Society had improved. He could assure them that he had enjoyed his year of Presidency. At that time last year he hoped, and he had every reason to expect, that the Show at Doncaster would have been one of record years. They all knew what happened, but they could not prevent that. They could not prevent the weather, but he had been glad during the past year to add his small endeavours to keep the Society in the state in which it had been going on for some years. There was one thing he would have liked to see, and that was a larger accession of Members to the Society. He noticed they had an increase by one since that time last year, and he could have hoped they could have taken a lesson from their friends in Norfolk and added considerably more to the membership for the year. He trusted that next year, when they were going into a different part of the country, that still more Members might be induced to join.

The meeting then terminated.

DONCASTER SHOW,

JULY 2 TO 6, 1912.

Officials of the Show.

PRESIDENT :

LORD MIDDLETON.

Honorary Director.

Sir GILBERT GREENALL, Bart., C.V.O., Walton Hall, Warrington.

Stewards of Live Stock.

Horses.

CYRIL E. GREENALL, The Manor, Carlton Scroop, Grantham.

JOHN ROWELL, Bury, Huntingdon.

Cattle.

JOSEPH HARRIS, Brackenbrough Tower, Carlisle.

Sheep and Pigs.

C. W. TINDALL, Wainfleet, S.O., Lincolnshire.

Steward of Dairying and Poultry.

ERNEST MATHEWS, Little Shardeloes, Amersham, Bucks.

Steward of Forage.

C. D. NICHOLSON, Stainton Manor, Rotherham.

Steward of Veterinary Examination.

CYRIL E. GREENALL, The Manor, Carlton Scroop, Grantham.

Stewards of Implements.

F. S. W. CORNWALLIS, Linton Park, Maidstone.

The Hon. J. E. CROSS, High Legh, Knutsford.

Stewards of Refreshments.

HOWARD FRANK, 20 Hanover Square, London, W.

WILLIAM HARRISON, Hall House, Leigh, Lancashire.

Steward of Education Exhibition.

Sir J. B. BOWEN-JONES, Bart., Council House Court, Shrewsbury.

Stewards of Horticultural Exhibition.

The Hon. JOHN R. DE C. BOSCAWEN, Tregye, Perranwell, Cornwall.

A. A. PATON, Oneida, Sefton Park, Liverpool.

Stewards of Forestry.

GEORGE MARSHALL, Broadwater, Godalming.

C. COLTMAN ROGERS, Stanage Park, Brampton Bryan.

Stewards of Finance.

CHARLES R. W. ADEANE, Babraham Hall, Cambridge.

THOMAS L. AVELING, Boley Hill House, Rochester.

RICHARDSON CARR, Estate Office, Tring Park, Herts.

Sir RICHARD COOPER, Bart., Shenstone Court, Lichfield.

Surveyor.

J. R. NAYLOR, F.R.I.B.A., Smith's Bank Chambers, Derby.

Secretary.

THOMAS MCROW, 16 Bedford Square, London, W.C.

JUDGES OF IMPLEMENTS.

Trials of Corn and Seed Drills.

CHARLES P. HALL, Park Farm Office, Woburn, Beds.

HEBER G. MARTIN, Littleport, Isle of Ely, Cambs.

Miscellaneous Implements entered for Silver Medals.

HARRY W. BUDDICOM, Penbedw, Nannerch, Mold.

J. B. ELLIS, Stanley House, St. Ives, Hunts.

JUDGES OF LIVE STOCK, &c.**HORSES.****Shires.**—*Classes 1-10.*

GEORGE COWING, Manor Farm, Yatesbury, Calne, Wilts.
JAMES GOULD, Crouchley, Lymm, Cheshire.

Clydesdales.—*Classes 11-18.*

ALEXANDER CLARK, Newton Farm, Markinch, Fife.
JOHN COCKER, Hill of Petty, Fyvie, N.B.

Suffolks.—*Classes 19-26.*

FRED C. PAINE, Crockfords, Newmarket.
CORDY S. WOLTON, The Hall, Lavenham, Suffolk.

Hunters.—*Classes 27-39 ; Riding Hunters.*—*Classes 67-73.*

ALFRED ASHTON, Forest Hill, Tarporley, Cheshire.
J. C. WILMOT-SMITH, The Hall, Boroughbridge.

Polo Ponies.—*Classes 40-44.*

A. M. TREE, The New Lodge, Ashorne Hill, Leamington.
A. J. WALMSLEY, The Priory, Tetbury, Glos.

Cleveland Bay and Coach Horse.—*Classes 45-49.*

THOMAS CURRY, Field House, Marton, S.O., Yorks.
THOMAS LEEFE, Fryton, Slingsby, Yorks.

Hackneys.—*Classes 50-58 ; and Hackney Ponies.*—*Classes 59-62.*

ALFRED BELDAM, River View, Earith, St. Ives, Hunts.
JAMES McMEEKEN, Mertonhall, Wigtownshire.

Shetland Ponies.—*Classes 63 and 64.*

FRANCIS N. M. GOURLAY, Milnton, Tynron, Dumfriesshire.

Welsh Ponies.—*Classes 65 and 66.*

W. FORRESTER ADDIE, Estate Office, Powis Castle, Welshpool.

POULTRY.*Classes 349-478.*

H. AINSCOUGH, Hillside, Parbold, Southport.
HARRY C. ARDRON, The Fosse, Syston, Leicester.
C. N. GOODE, Peckfield Lodge, South Milford, R.S.O., Yorkshire.
Dr. E. S. JACKSON, Robin Hill, Carnforth.
W. G. KINGWELL, Dartmoor Poultry Farm, South Brent, South Devon.
THOMAS LAMBERT, Bourne Hill, Hadlow, Kent.
E. H. TURRELL, Ide Cottage, Ide Hill, Sevenoaks.
JOHN WILKINSON, Burrow House, Scotforth, Lancaster.

PRODUCE.**Butter.**—*Classes 479-484.*

Miss A. D. MCKERROW, Manor Farm, Garforth, nr. Leeds.

Cheese.—*Classes 485-494.*

A. N. SHORTO, Army and Navy Co-operative Society, Ltd., 105 Victoria Street, Westminster, S.W.
THOMAS WELSBY, 9, Wellington Road, Rhyl.

Bread.—*Classes 495-498.*

A. L. JOHNSTON, 3 Bank Buildings, Wimbledon, Surrey.

Cider and Perry.—*Classes 499-506.*

B. T. P. BARKER, M.A., Long Ashton, Bristol.
JOHN H. WOOTTON, Byford, Hereford.

Wool.—*Classes 507-509.*

Dr. F. H. BOWMAN, 4 Albert Square, Manchester.

Hives and Honey.—*Classes 510-536.*

F. J. CRIBB, Sand Rock House, Retford.
J. H. HADFIELD, Hamilton Place, Alford, Lincs.
G. HAYES, Melhurst, Mona Street, Beeston, Notts.
W. F. REID, Field Side, Addlestone, Surrey.

COMPETITIONS.

Jumping.

MICHAEL G. LLOYD BAKER, The Cottage, Hardwicke, Gloucester.
F. L. GOOCH, F.R.C.V.S., St. Martin's, Stamford.
F. H. SCHWIND, Badminton Club, Piccadilly, W.

Horse-shoeing.

LLOYD JONES, M.R.C.V.S., 27 High Street, Doncaster.
ROBERT VIGAR, A.F.C.L., Towns End, Caterham, Surrey.

Butter-making.

Professor R J. DRUMMOND, Dairy School, Kilmarnock.

FARMS.

Classes 1 and 2.

HENRY GILES, 27 Prince of Wales Road, Norwich.
HENRY HAWKING, Avondale, Easingwold, Yorkshire.

Classes 3-5.

GEORGE HARRISON, Gainford Hall, Darlington.
G. G. REA, Middleton Hall, Wooler R.S.O., Northumberland.

PLANTATIONS AND HOME NURSERIES.

CHARLES HANKINS, Wordwell, Culford, Bury St. Edmund's.
WILLIAM SOMERVILLE, M.A., 121 Banbury Road, Oxford.

FORESTRY.

J. C. BLOFELD, 13 Upper King Street, Norwich.
J. P. ROBERTSON, Edensor, Bakewell.

HORTICULTURE.

N. F. BARNES, Eaton Gardens, Chester.
A. MACKELLAR, Royal Gardens, Windsor.
THOMAS STEVENSON, Woburn Place Gardens, Addlestone, Surrey.
JAMES VERT, Audley End Gardens, Saffron Walden.

CHIEF VETERINARY OFFICER.

JOHN MALCOLM, F.R.C.V.S., Holliday Street Wharf, Birmingham.

VETERINARY INSPECTORS.

LLOYD JONES, M.R.C.V.S., 27 High Street, Doncaster.
Professor J. MACQUEEN, F.R.C.V.S., Royal Veterinary College, Camden Town, London, N.W.
JOSEPH ABSON, F.R.C.V.S., Norfolk Street, Sheffield.
PERCY ABSON, M.R.C.V.S., 33 Hall Gate, Doncaster.
F. L. GOOCH, F.R.C.V.S., St. Martin's, Stamford.
CHARLES HARTLEY, F.R.C.V.S., 43 Friars Lane, Lincoln.
J. S. LLOYD, F.R.C.V.S., Veterinary Department, Town Hall, Sheffield.
GEORGE R. SIMPSON, M.R.C.V.S., 3 George Street, Driffield.

ASSISTANT VETERINARY OFFICER.

WILLIAM TRIGGER, F.R.C.V.S., Newcastle, Staffs.

AWARDS OF PRIZES AT DONCASTER, 1912.

ABBREVIATIONS.

I., First Prize. II., Second Prize. III., Third Prize. IV., Fourth Prize.
V., Fifth Prize. R. N., Reserve Number. H. C., Highly Commended.

N.B.—The responsibility for the accuracy of the description or pedigree, and for the eligibility to compete of the animals entered in the following classes, rests solely with the Exhibitors.

Unless otherwise stated, each Prize Animal in the Classes for Horses was "bred by Exhibitor."

HORSES. Shires.

No. in
Cata-
logue

Class 1.—*Shire Stallions, foaled in 1911.*

[14 entries, 5 absent.]

- 9 I. (£20.¹ & R. N. for Champion.²)—LORD ROTHSCHILD, Tring Park, Herts., for **Champion's Goalkeeper**, brown, bred by the Earl of Powis, Powis Castle, Welshpool; s. Childwick Champion 22215, d. Themis of Welshpool 62107 by Oak Apple 5th 23570.
- 4 II. (£10.¹)—F. W. GRIFFIN, Boro' Fen, Peterborough, for **Moors Bridegroom**, bay, bred by Edward Green, The Moors, Welshpool; s. Moors Kitchener 25443, d. Evenall Baroness 51020 by Rocks Golden Bar 19070.
- 14 III. (£5.¹)—W. & H. WHITLEY, Primley Farm, Paignton, for **Primley Draughtsman**, black; s. Tatton Dray King 23777, d. Quality 46043 by Dunsmore Jameson.
- 8 IV. (£4.)—SIR ARTHUR NICHOLSON, Highfield Hall, Leek, for **Leek Challenger**, bay, bred by John Cotton, The Grange, Weston-on-Trent; s. Redlynch Forest King 23626, d. Eekington Chance 44816 by Lockinge Emperor 2nd 18157.
- 13 R. N. & H. C.—SIR BERKELEY G. D. SHEFFIELD, BT., Normanby Park, Doncaster, for **Bamford Kingmaker**.

Class 2.—*Shire Stallions, foaled in 1910.* [14 entries, 6 absent.]

- 19 I. (£20. & Champion.²)—JAMES FORSHAW & SONS, Carlton-on-Trent, Newark, for **Tandridge Coming King** 29926, bay, bred by Max Michaelis, Tandridge Court, Oxted; s. King of Tandridge 24351, d. Alexandra of Tandridge 46852 by Victor of Waresley 19212.
- 25 II. (£10.)—LORD ROTHSCHILD, Tring Park, Herts., for **Blacklands Kingmaker** 29102, bay, bred by W. G. Amos, Manor Farm, Drayton Parslow, Bletchley; s. Blythwood Kingmaker 18534, d. Blacklands June Rose 38085 by Royal Guardian 18330.
- 21 III. (£5.)—F. W. GRIFFIN, Boro' Fen, Peterborough, for **Rowington Dray King** 29795, dark brown, bred by T. Horn, Rowington, Warwick; s. Friar John 24266, d. Darwen Dray Queen 53586 by Drayman 23rd 19551.
- 23 IV. (£4.)—JOHN C. JACKSON, The Grange, Askern, Doncaster, for **Blacklands Prince Harold** 29103, brown, bred by W. G. Amos, Manor Farm, Drayton Parslow, Bletchley; s. Blythwood Kingmaker 18534, d. Blacklands Lady Harold 44146 by Puckrup Prince Harold 18294.
- 26 R. N. & H. C.—LORD ROTHSCHILD, for **Farmer Duke**.

Class 3.—*Shire Stallions, foaled in 1909.* [12 entries, 4 absent.]

- 29 I. (£20.)—J. F. ATTERBURY, Welford, Rugby, for **King Premier**, bay, bred by Exors. of the late Sir P. A. Muntz, Bt., Dunsmore, Rugby; s. Dunsmore Premier 25160, d. Dunsmore Flirty 47820 by Dunsmore Jameson 17972.
- 35 II. (£10.)—A. GRANDAGE, Stud Farm, Bramhope, Leeds, for **Gaer Right Sort** 28324, bay, bred by the late C. D. Phillips, The Gaer, Newport, Mon.; s. Gaer Conqueror 25218, d. Danetree Peggy 31603 by Hendre Swell 15631.

¹ Prizes given by the Shire Horse Society.

² Champion Gold Medal given by the Shire Horse Society for the best Stallion in Classes 1-3.

Award of Live Stock Prizes at Doncaster, 1912. li

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 34 **III (£5).**—JAMES FORSHAW & SONS, Carlton-on-Trent, Newark, for **Leonardo** 28462, brown, bred by C. P. Yates, Catterall Hall, Garstang; s. Leo 2nd 23432, d. Catterall Beauty 38425 by Sir George of Willington 16975.

- 39 **R. N. & H. C.**—W. & H. WHITLEY, Primley Farm, Paignton, for **Primley Bellivor**.

Class 4.—*Shire Fillies, foaled in 1911.* [17 entries, 7 absent.]

- 49 **I. (£20.**¹**)**—SIR ARTHUR NICHOLSON, Highfield Hall, Leek, for **Leek Dorothy**, bay; s. Redlynch Forest King 23626, d. Leek Dainty 51487 by Girtton Meteor 19649.

- 53 **II. (£10.**¹**)**—MRS. SAUBER, Preston Hall, Aylesford, for **Tandridge Rosette**, bay, bred by Max Michaelis, Tandridge Court, Oxted; s. King of Tandridge 24351, d. Sweldon Charm 46446 by Calwich Captain 16041.

- 47 **III. (£5.**¹**)**—ROBERT HEATH, Biddulph Grange, Biddulph, Staffs., for **Biddulph Blanche**, bay, bred by R. Whitehead, Hargate Hall, Buxton; s. New Cut Harold 2nd 25486, d. Babingley Gladys 50110 by Calwich Blend 17226.

- 43 **IV. (£4.)**—THE DUKE OF DEVONSHIRE, Chatsworth, Chesterfield, for **Chatsworth Bonny**, bay, bred by Charles Wood, Pilsley, Bakewell; s. Holker Mars 26309, d. Bonny 59479 by Quick March 3rd 14232.

- 44 **R. N. & H. C.**—THE DUKE OF DEVONSHIRE, for **Chatsworth Stella**.

Class 5.—*Shire Fillies, foaled in 1910.* [11 entries, 3 absent.]

- 61 **I. (£20.)**—SIR WALPOLE GREENWELL, BT., Marden Park, Woldingham, for **Marden Constance** 67777, bay; s. Norbury Menestrel 23543, d. Marden Peach 54607 by Lockinge Forest King 18867.

- 65 **II. (£10.)** LORD ROTHCHILD, Tring Park, Herts., for **Halstead Duchess 7th** 67223, bay, bred by John Bradley, Halstead, Tilton, Leicester; s. Redlynch Forest King 23626, d. Halstead Duchess 6th 54035 by Menestrel 14180.

- 64 **III. (£5.)**—W. EDWARD PORTER, The Hollies, Deeping St Nicholas, Spalding, for **Stantonhouse Lucy Redlynch**, chestnut, bred by Edward Holland, Mill Hill, Sandbach, Cheshire; s. Redlynch Forest King 23626, d. Willaston Baroness 43833 by Hendre Baronet 16714.

- 67 **IV. (£4.)**—SIR BERKELEY G. D. SHEFFIELD, BT., Normanby Park, Doncaster, for **Normanby Royal Girl** 68037, bay; s. Halstead Royal Duke 25255, d. Country Girl 53509 by Blythwood Kingmaker 18534.

- 60 **R. N. & H. C.**—W. F. GLASIER, Central House, Winterton, Doncaster, for **Roxby Queen Mary**.

Class 6.—*Shire Fillies, foaled in 1909.* [8 entries, 2 absent.]

- 75 **I. (£20. & Champion.**²**)**—W. & H. WHITLEY, Primley Farm, Paignton, for **Lorna Doone** 64248, brown, bred by T. Green, The Bank, Pool Quay, Welshpool; s. Childwick Champion 22215, d. Bank Roseleaf 52901 by Bank Nil Desperandum 21096.

- 70 **II. (£10. & R. N. for Champion.**²**)**—JOHN BRADLEY, Halstead, Tilton, Leicester, for **Halstead Royal Duchess** 63853, bay; s. Lockinge Forest King 18867, d. Halstead Duchess 3rd 42121 by Menestrel 14180.

- 73 **III. (£5.)**—MRS. SAUBER, Preston Hall, Aylesford, for **Tandridge Delight** 65127, bay, bred by Max Michaelis, Tandridge Court, Oxted; s. Shamrock of Tandridge 25620, d. Pailton Sorais 45919 by Lockinge Forest King 18867.

- 71 **R. N. & H. C.**—F. W. GRIFFEN, Boro' Fen, Peterborough, for **Boro' Forest Lady**.

Class 7.—*Shire Mares, foaled in or after 1908, with Foals at foot.*

[13 entries, 3 absent.]

- 81 **I. (£20.)**—JAMES FORSHAW & SONS, Carlton-on-Trent, Newark, for **Silfield Belle** 64881, brown, foaled in 1908, bred by Arthur Parkinson, Silfield Lodge, Wymondham; s. Rickford Friar 21799, d. Sowerby Belle 46318 by Drayman 23rd 19551. [Foal by Firaw Forest Chief 27326.]

- 83 **II. (£10.)**—TIMOTHY LOWE, Stanton House, Burton-on-Trent, for **Yatesbury Sunlight** 65530, bay, foaled in 1908, bred by George Cowing, Yatesbury, Calne, Wilts; s. King of the Roses 24352, d. Creslow Sunlight 56623 by Beachendon Royal Harold 19325. [Foal by Sterling Jameson 2728.]

- 87 **III. (£5.)**—THE DUKE OF WESTMINSTER, Eaton Hall, Chester, for **Caronia** 59740, bay, foaled in 1908, bred by H. Watson, Hargrave, Chester; s. Lymm Champion 22562, d. Caronia 41469 by Codnor Harold 17266. [Foal by Phenomenon 3rd 18272.]

- 85 **IV. (£4.)**—LEOPOLD SALOMONS, Norbury Park, Dorking, for **Abingworth Gipsy** 59031, grey, foaled in 1908, bred by S. C. Peach, Abingworth, Thakeham, Pulborough; s. Sussex Menestrel 23770, d. Foundation 38992 by Ivy Jubilee Harold 17418. [Foal by Dowsby Forest King 27253.]

- 89 **R. N. & H. C.**—J. G. WILLIAMS, Pendley Manor, Tring, for **Pendley May Queen**.

¹ Prizes given by the Shire Horse Society.

² Champion Gold Medal given by the Shire Horse Society for the best Mare or Filly in Classes 4-8.

lii *Award of Live Stock Prizes at Doncaster, 1912.*

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 8.—Shire Mares, foaled in or before 1907, with Foals at foot.

[16 entries, 8 absent.]

- 105 **I.** (£20.)—W. & H. WHITLEY, Primley Farm, Paignton, for **Mollington Movement** 48793, bay, foaled in 1904, bred by C. E. Bruce Fry, Mollington, Banbury; s. Lockinge Forest King 18867, d. Catthorpe Malmaison 16389 by Cronton Magna Charta 9165. [Foal by Primley Bellivor 28679.]
- 98 **II.** (£10.)—F. E. MUNTZ, Umberslade, Hockley Heath, for **Kathleen** 60841, dark brown, foaled in 1905, bred by E. Jackson, Sugnypwll, Trevor, Ruabon; s. Erddig Baronet 20469, d. Darby by Moors Zealot 15731. [Foal by King Forest 24347.]
- 103 **III.** (£5.)—SIR BERKELEY G. D. SHEFFIELD, BT., Normanby Park, Doncaster, for **Lawford Diamond** 48506, brown, foaled in 1904, bred by E. T. Banks, Weedon; s. Lockinge Forest King 18367, d. Black Bess 34852 by Nailstone Royal Herald 15746. [Foal by Forage President 27342.]
- 95 **IV.** (£4.)—JAMES FORSHAW & SONS, Carlton-on-Trent Newark, for **Frodingham Bertha** 63744, brown, foaled in 1907, bred by John Coward, Cowran, Pennington, Ulverston; s. Holker Essential 22447, d. Blossom by Whitstone Glad Tidings 19245. [Foal by Frodingham Peer 27352.]
- 104 **R. N. & H. C.**—SIR EDWARD STERN, Fan Court, Chertsey, for **Lockinge Forest Daisy**.

Class 9.—Shire Colt Foals, the produce of Mares entered in Classes 7 or 8.

[19 entries, 7 absent.]

- 116 **I.** (£10.)—W. EDWARD PORTER, The Hollies, Deeping St. Nicholas, Spalding, for brown, foaled Feb. 29; s. Babingley Nulli Secundus 26993, d. Iron Starlight 64009 by Chipping Squire 2nd 24136.
- 108 **II.** (£5.)—A. H. CLARK, Moulton Eaugate, Spalding, for bay, foaled April 1; s. Babingley Nulli Secundus 26993, d. Tatton Duchess 62082 by Tatton Dray King 23777.
- 109 **III.** (£3.)—JAMES CROOK, Shuttleworth Hall, Hapton, Burnley, for bay, foaled March 18; s. Charterhouse Forester 27171, d. Directoire 60114 by Ringway Harold 20847.
- 124 **R. N. & H. C.**—J. G. WILLIAMS, Pendley Manor, Tring.

Class 10.—Shire Filly Foals, the produce of Mares entered in Classes 7 or 8.

[7 entries, 4 absent.]

- 126 **I.** (£10.)—B. N. EVERARD, Bardon Hall, Leicester, for brown, foaled April 13; s. Bardon Forest Premier 25890, d. Needwood Belle 61307 by Codnor Harold 17266.
- 131 **II.** (£5.)—LEOPOLD SALOMONS, Norbury Park, Dorking, for bay, foaled April 3; s. Dowsby Forest King 27253, d. Abingworth Gipsy 59031 by Sussex Menestrel 23770.
- 127 **III.** (£3.)—JAMES FORSHAW & SONS, Carlton-on-Trent, Newark, for **Carlton Marion**, brown, foaled April 12; s. Frodingham Peer 27352, d. Frodingham Bertha 63744 by Holker Essential 22447.

Clydesdales.¹

Class 11.—Clydesdale Stallions, foaled in 1911. [10 entries, 4 absent.]

- 140 **I.** (£20.)—A. & W. MONTGOMERY, Netherhall and Banks, Kirkcudbright, for bay, bred by J. Ernest Kerr, Harviestoun Castle, Dollar; s. Baron's Pride 9122, d. Nellie 16782 by Royal Favourite 10630.
- 134 **II.** (£10.)—W. DUNLOP, Dunure Mains, Ayr, for **Dunure Stephen**, bay, bred by Stephen Mitchell, Boquhan, Kippen Station; s. Baron of Buchlyvie 11263, d. Minnie-wawa 21620 by Hiawatha 10067.
- 138 **III.** (£5.)—STEPHEN MITCHELL, Boquhan, Kippen Station, for **Boquhan Magnet**, brown; s. Apukwa 14567, d. Boquhan Blossom 23986 by Balmedie Queen's Guard.
- 136 **R. N. & H. C.**—JAMES KILPATRICK, Craigie Mains, Kilmarnock, for **Craigie Elect**.

Class 12.—Clydesdale Stallions, foaled in 1910. [9 entries, 2 absent.]

- 145 **I.** (£20. & Champion.²)—W. DUNLOP, Dunure Mains, Ayr, for **The Dunure**, brown, bred by J. & T. Robertson, Clendrie, Kirkcolum; s. Baron of Buchlyvie 11263, d. Carina 2nd 16323 by Hiawatha 10067.
- 148 **II.** (£10. & R. N. for Champion.²)—A. & W. MONTGOMERY, Netherhall and Banks, Kirkcudbright, for **Baron Derby** 16458, bay, bred by J. Ernest Kerr, Harviestoun Castle, Dollar; s. Baron's Pride 9122, d. Gitana 14717 by Hiawatha 10067.
- 149 **III.** (£5.)—A. & W. MONTGOMERY, for **Baron's Guard** 16460, bay, bred by W. G. Campbell, High Bogue, Kirkcudbright; s. Baron's Pride 9122, d. Maude 15980 by Montrave Mac 9958.
- 147 **R. N. & H. C.**—JAMES KILPATRICK, Craigie Mains, Kilmarnock.

¹ £50 towards these Prizes were given by the Clydesdale Horse Society.

² Champion Prize of £10 given by the Clydesdale Horse Society for the best Stallion in Classes 11-13.

Award of Live Stock Prizes at Doncaster, 1912. liii

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 13.—*Clydesdale Stallions, foaled in 1909.* [6 entries, none absent.]

- 155 I. (£20.)—A. & W. MONTGOMERY, Netherhall and Banks, Kirkcudbright, for **Earl of Westfield**, brown, bred by James Smith, Westfield Farm, Winchburgh; s. Earl of Clay 13458, d. Sally Hood 14043 by Flashwood's Best 9211.
 154 II. (£10.)—JAMES KILPATRICK, Craigie Mains, Kilmarnock, for **Revolution**, bay, bred by Robert Forrest, Knockenlaw, Kilmarnock; s. Revelenta 11876, d. Lily of Knockenlaw 16081 by Prince Alexander 8899.
 151 III. (£5.)—ROBERT BRYDON, The Dene, Seaham Harbour, for **Robin Adair** 16013, brown, bred by T. Lean, Wester Deans, Leadburn; s. Royal Water 13717, d. Rossie 19808 by Elexender Everard 11242.
 152 R. N. & H. C.—W. DUNLOP, Dunure Mains, Ayr, for **Dunure Vintage**.

Class 14.—*Clydesdale Fillies, foaled in 1911.* [4 entries, 1 absent.]

- 158 I. (£20.)—JAMES GRAY, Birkenwood, Gargunnoch, Stirling, for **Esmer**, bay; s. Apukwa 14567, d. Lady Jane 19589 by Balmedie Queen's Guard 10966.
 157 II. (£10.)—ROBERT BRYDON, The Dene, Seaham Harbour, for **Silver Bangle**, brown; s. Bonnie Buchlyvie 14032, d. Syringa 26129 by Silver Cup 1184.
 159 III. (£5.)—J. ERNEST KERR, Harviestoun Castle, Dollar, for **Harviestoun Aline**, bay, bred by W. Hood, Kirkcudbright; s. Baron's Pride 9122, d. Balmac Mattie 29750 by Sylvander 10935.

Class 15.—*Clydesdale Fillies, foaled in 1910.* [6 entries, none absent.]

- 163 I. (£20, & R.N. for Champion.¹)—J. ERNEST KERR, Harviestoun Castle, Dollar, for **Phyllis**, bay; s. Royal Favourite 10630, d. Chester Princess 16371 by Baron's Pride 9122.
 166 II. (£10.)—STEPHEN MITCHELL, Boquhan, Kippen Station, for **Nannie**, bay, bred by James Gray, Birkenwood, Gargunnoch; s. Apukwa 14567, d. Lady Jane 19589 by Balmedie Queen's Guard 10966.
 164 III. (£5.)—J. & W. MEIKLEM, Begg Farm, Kirkcaldy, for brown; s. Royal Favourite 10630, d. Begg Baroness 20014 by Baron's Pride 9122.
 165 R. N. & H. C.—STEPHEN MITCHELL, for **Boquhan Diamond**.

Class 16.—*Clydesdale Fillies, foaled in 1909.* [5 entries, none absent.]

- 169 I. (£20.)—J. & W. MEIKLEM, Begg Farm, Kirkcaldy, for **Dunure Myrene**, bay, bred by R. Waldie, Muircleugh, Lauder; s. Baron of Buchlyvie 11263, d. Muircleugh Belle 18447 by Montrave Mac 9958.
 168 II. (£10.)—J. ERNEST KERR, Harviestoun Castle, Dollar, for **Doris**, bay, bred by J. Armstrong, Whitehill, Huntly; s. Everlasting 11331, d. Mary of Whitehill 19047 by Gay Montrose 9916.
 171 III. (£5.)—STEPHEN MITCHELL, Boquhan, Kippen Station, for **Margaret Love**, bay, bred by Alex. Morton, Stepps Farm, Stepps; s. Baron of Buchlyvie 11263, d. Miss Hiawatha 24007 by Hiawatha 10067.
 170 R. N. & H. C.—STEPHEN MITCHELL, for **Boquhan Ruby**.

Class 17.—*Clydesdale Mares with Foals at foot.* [4 entries, 2 absent.]

- 173 I. (£20, & Champion.¹)—STEPHEN MITCHELL, Boquhan, Kippen Station, for **Boquhan Lady Peggy**, brown, foaled in 1906, bred by D. & J. Carr, Red House, Carlisle; s. Hiawatha 10067, d. Lady Peggy 15453 by Baron's Pride 9122. [Foal by Dunure Footprint 15203.]
 172 II. (£10.)—ROBERT BRYDON, The Dene, Seaham Harbour, for **Mimosa**, bay, foaled in 1907, bred by George H. Procter, Flass House, Durham; s. Silver Cup 11184, d. Muriel 15784 by Gallant Prince 10552. [Foal by Bonnie Buchlyvie 14032.]

Class 18.—*Clydesdale Foals, the produce of Mares entered in Class 17.*

[3 entries, 1 absent.]

- 177 I. (£10.)—STEPHEN MITCHELL, Boquhan, Kippen Station, for **Boquhan Lady Margaret**, black filly, foaled March 24; s. Dunure Footprint 15203, d. Boquhan Lady Peggy (vol. 29, p. 44) by Hiawatha 10067.
 176 II. (£5.)—ROBERT BRYDON, The Dene, Seaham Harbour, for bay filly, foaled June 6; s. Bonnie Buchlyvie 14032, d. Mimosa by Silver Cup 11184.

Suffolks.²

Class 19.—*Suffolk Stallions, foaled in 1911.* [6 entries, 1 absent.]

- 183 I. (£20.)—ARTHUR T. PRATT, Morston Hall, Trimley, Ipswich, for **Morston Honesty** 3965, bred by E. H. Williams, Alderton Hall, Woodbridge; s. Bawdsey Harvester 3076, d. Belladonna 5076 by Valiant 2359.
 181 II. (£10.)—KENNETH M. CLARK, Sudbourne Hall, Orford, Suffolk, for **Sudbourne Eclipse** 3966; s. Sudbourne Arabi 3287, d. Sudbourne Massie 5869 by Eclipse 2627.

¹ Champion Prize of £10 given by the Clydesdale Horse Society for the best Mare or Filly in Classes 14-17.

² £50 towards these Prizes were given by the Suffolk Horse Society.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 179 **III.** (£5.)—**E. SCOTT CATCHPOLE**, Dodnash Priory, Bentley, Ipswich, for **Bentley Cupbearer** 4044, bred by G. P. Watkins, Culpho, Ipswich; s. Saturn 2653, d. Bonnie 5110 *by* Cordus Homoea 2643.

- 184 **R. N. & H. C.**—**W. E. S. & P. H. WILSON**, Hadleigh, Suffolk, for **Hadleigh Friar**.

Class 20.—*Suffolk Stallions, foaled in 1910.* [12 entries, 5 absent.]

- 189 **I.** (£20, & **R. N.** for **Champion**.¹)—**SIR CUTHBERT QUILTER, BT., M.P.**, Methersgate Hall, Woodbridge, for **Bawdsey Harvest King** 3879, bred by the late Sir Cuthbert Quilter, Bt., Bawdsey Manor; s. Bawdsey Harvester 3076, d. Bawdsey Marguerite 3733 *by* Eclipse 2010.

- 185 **II.** (£10.)—**KENNETH M. CLARK**, Sudbourne Hall, Orford, for **Sudbourne Aerolite** 3902; s. Sudbourne Arabi 3287, d. Sudbourne Daylight 5924 *by* Dennington Cup-Bearer 3086.

- 186 **III.** (£5.)—**ARTHUR T. PRATT**, Morston Hall, Trimley, Ipswich, for **Morston George** 3853, bred by Mr. Hart, Ipswich; s. Neptune 3005, d. Gipsy *by* Windsor Chieftain.

- 188 **R. N. & H. C.**—**SIR CUTHBERT QUILTER, BT.**, for **Bawdsey Boaz**.

Class 21.—*Suffolk Stallions, foaled in 1909.* [8 entries, none absent.]

- 198 **I.** (£20, & **Champion**.¹)—**KENNETH M. CLARK**, Sudbourne Hall, Orford, for **Sudbourne Peter** 3955, bred by E. H. Williams, Alderton, Suffolk; s. Bawdsey Harvester 3076, d. Maggie 3628 *by* Hereward 2253.

- 199 **II.** (£10.)—**JAMES FORREST**, Tattingstone Hall, Ipswich, for **Alpha** 3894; s. Bawdsey Harvester 3076, d. Sudbourne Sally 5428 *by* Verger 1550.

- 204 **III.** (£5.)—**R. EATO* WHITE**, Boulge Hall, Woodbridge, for **Boulge Bombardier** 3665; s. Boulge Monarch 3054, d. Brandy 4169 *by* Eclipse 2027.

- 197 **R. N. & H. C.**—**E. SCOTT CATCHPOLE**, Bentley, Ipswich, for **Bentley Honor**.

Class 22.—*Suffolk Fillies, foaled in 1911.* [3 entries.]

- 205 **I.** (£20.)—**KENNETH M. CLARK**, Sudbourne Hall, Orford, for **Sudbourne Peach** 7124; s. Sudbourne Arabi 3287, d. Sudbourne Peace 5784 *by* Border Minstrel 2287.

- 207 **II.** (£10.)—**SIR CUTHBERT QUILTER, BT., M.P.**, Methersgate Hall, Woodbridge, for **Bawdsey China Doll** 2nd 7252, bred by the late Sir Cuthbert Quilter, Bt., M.P., Bawdsey Manor; s. Bawdsey War Cry 3028, d. Bawdsey Wax Doll 6493 *by* Bawdsey Harvester 3076.

- 206 **III.** (£5.)—**KENNETH M. CLARK**, for **Sudbourne Sweet-bell** 7228; s. Sudbourne Counter 3478, d. Sudborne Harebell 517 *by* Verger 1550.

Class 23.—*Suffolk Fillies, foaled in 1910.* [5 entries, 1 absent.]

- 210 **I.** (£20.)—**SIR CUTHBERT QUILTER, BT., M.P.**, Methersgate Hall, Woodbridge, for **Bawdsey Bloom** 7034, bred by the late Sir Cuthbert Quilter, Bt., Bawdsey Manor; s. Bawdsey Harvester 3076, d. Ramsholt Blossom 3716 *by* Prince Arthur 2268.

- 208 **II.** (£10.)—**KENNETH M. CLARK**, Sudbourne Hall, Orford, for **Sudbourne Abbess** 6706; s. Sudbourne Arabi 3287, d. Sudbourne Bessie 5501 *by* Dimple Dick 2497.

- 211 **III.** (£5.)—**SIR CUTHBERT QUILTER, BT.**, for **Bawdsey Statuette** 7033, bred by the late Sir Cuthbert Quilter, Bt., Bawdsey Manor; s. Bawdsey Harvester 3076, d. Bawdsey China Doll 4299 *by* Prince Wedgewood 2364.

- 209 **R. N. & H. C.**—**KENNETH M. CLARK**, for **Sudbourne Connie**.

Class 24.—*Suffolk Fillies, foaled in 1909.* [4 entries.]

- 214 **I.** (£20.)—**KENNETH M. CLARK**, Sudbourne Hall, Orford, for **Sudbourne Belladonna** 6711; s. Sudbourne Arabi 3287, d. Sudbourne Beauty 5511, *by* Prince Albert 2525.

- 213 **II.** (£10.)—**KENNETH M. CLARK**, for **Sudbourne Arcadia** 6697; s. Sudbourne Sunshine 3374, d. Sudbourne Arabelle 5472 *by* Wedgewood 1749.

- 215 **III.** (£5.)—**ARTHUR T. PRATT**, Morston Hall, Trimley, Ipswich, for **Teasel** 6572, bred by E. A. Cook, Dennington, Framlingham; s. Oliver 3227, d. Parham Duchess 5041 *by* Wedgewood 2nd 2045.

- 216 **R. N. & H. C.**—**SIR CUTHBERT QUILTER, BT., M.P.**, for **Bawdsey Hebe**.

Class 25.—*Suffolk Mares, with Foals at foot.* [5 entries, 1 absent.]

- 218 **I.** (£20.)—**SIR CUTHBERT QUILTER, BT., M.P.**, Methersgate Hall, Woodbridge, for **Bawdsey Jewel** 6485, foaled in 1906, bred by the late Sir Cuthbert Quilter, Bt., Bawdsey Manor; s. Sudbourne Count 3257, d. Sutton Ruby 5689 *by* Warrior 1938. [Foal *by* Bawdsey Laddie 3637.]

- 220 **II.** (£10.)—**SIR CUTHBERT QUILTER, BT., M.P.**, for **Bawdsey Wax Doll** 6493, foaled in 1907, bred by the late Sir Cuthbert Quilter, Bt., Bawdsey Manor; s. Bawdsey Harvester 3076, d. Bawdsey China Doll 4299 *by* Prince Wedgewood 2364. [Foal *by* Bawdsey Marshal Ney 3385.]

- 217 **III.** (£5.)—**KENNETH M. CLARK**, Sudbourne Hall, Orford, for **Sudbourne Diamond** 6604, foaled in 1907, bred by the Rev. A. Maude, Badwell Ash, Bury St. Edmunds; s. War Cry 3028, d. Badwell Depper 5724 *by* Tatler. [Foal *by* Sudbourne Arabi 3287.]

- 219 **R. N. & H. C.**—**SIR CUTHBERT QUILTER, BT., M.P.**, for **Bawdsey Minerva**.

¹ "Coronation" Challenge Cup given by the Suffolk Horse Society for the best Stallion in Classes 19-21.

Award of Live Stock Prizes at Doncaster, 1912. lv

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 26.—*Suffolk Foals, the produce of Mares entered in Class 25.*

[5 entries, 1 absent.]

- 223 I. (£10).—SIR CUTHBERT QUILTER, BT., M.P., Methersgate Hall, Woodbridge, for filly, foaled April 2; s. Bawdsey Laddie 3637, d. Bawdsey Jewel 6485 by Sudbourne Count 3257.
- 225 II. (£5).—SIR CUTHBERT QUILTER, BT., M.P., for colt, foaled March 9; s. Bawdsey Marshal Ney 3385, d. Bawdsey Wax Doll 6493 by Bawdsey Harvester 3076.
- 222 III. (£3).—KENNETH M. CLARK, Sudbourne Hall, Orford, for filly, foaled January 29; s. Sudbourne Arabi 3287, d. Sudbourne Diamond 6604 by War Cry 3028.
- 224 R. N. & H. C.—SIR CUTHBERT QUILTER, BT., M.P., for filly.

Hunters.¹

Class 27.—*Hunter Colts or Geldings, foaled in 1911.* [14 entries, 1 absent.]

- 228 I. (£20).—E. W. GOLDSWORTHY, Yaldham Manor, Kemsing, Sevenoaks, for Jasper, chestnut colt, bred by the late Major-General Goldsworthy, Yaldham Manor; s. Red Heart, d. Diamond 3365 by Eglamore.
- 230 II. (£10).—HAROLD GRAINGER, Clifford, Boston Spa, for Eclipse, grey gelding; s. Grand Medal, d. Lady Greylock by Blacklock.
- 240 III. (£5).—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, for Travelling Lad, chestnut colt, bred by Mr. Drewery, Rafnall, Newark; s. Travelling Lad.
- 236 IV. (£4).—FRANCIS SAMUELSON, Breckenbrough Hall, Thirsk, for Rathdrum, bay gelding; s. Drummer Kelly, d. Mullingar Junior 3954 by Trundle Hill.
- 227 R. N. & H. C.—R. L. FENWICK, Little Belvoir, Melton Mowbray.

Class 28.—*Hunter Geldings, foaled in 1910.* [10 entries, none absent.]

- 248 I. (£20).—WILLIAM H. SHIERS, The Red House, Hartford, Cheshire, for Walnut 2nd (Supp. No. 113), bay, bred by F. B. Wilkinson, Cavendish Lodge, Edwinstowe Newark; s. Blankney (vol. 16), d. Beechnut 2nd 3284.
- 250 II. (£10).—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, for Splendour, grey, bred by F. Ward, Quarrington, Lincs.; s. Splendour.
- 246 III. (£5).—EDWARD HODGSON, The Hollows, Bridlington, for J.P., bay, bred by T. Brenen, Brannockstown, Ireland; s. Eminent, d. by Delamont.
- 243 IV. (£4).—HAROLD GRAINGER, Clifford, Boston Spa, for Statesman, grey; s. Wales (vol. 18, p. 854 G.S.B.), d. Lady Greylock by Blacklock.

Class 29.—*Hunter Geldings, foaled in 1909.* [10 entries, 1 absent.]

- 256 I. (£20).—EDWARD HODGSON, The Hollows, Bridlington, for Mince Pie (Supp. 141), chestnut, bred by T. Hutchinson, Birtown, Ireland; s. Favonian d. by Sir Reginald.
- 251 II. (£10).—CAPTAIN CLIVE BEHRENS, Swinton Grange, Malton, for Thistledown (Supp. 140), brown; s. Scotch Sign, d. Whinflower 3801 by The Hero.
- 254 III. (£5).—ROBERT J. FOSTER, Stockeld Park, Wetherby, for Nimble Ninepence, brown, bred by E. C. Morgan, Stud Farm, North Grimston; s. Scotch Sign, d. Betty by King Caradoc.
- 260 R. N. & H. C.—FRANK B. WILKINSON, Edwinstowe, Newark, for Royal Acorn.

Class 30.—*Hunter Fillies, foaled in 1911.* [13 entries, none absent.]

- 268 I. (£20, & Champion.*)—J. L. NICKISSON, Hinton Manor, Swindon, for Red Squaw 4313, chestnut; s. Red Sahib 75, d. Sister Anne 3723 by Pantomime.
- 262 II. (£10).—SIR MERRIK R. BURRELL, BT., Knepp Castle, Horsham, for Coquette, brown; s. Hanover Square, d. Casual 4080 by Castlenock.
- 263 III. (£5).—SIR MERRIK R. BURRELL, BT., for Coronation Lass 4336, bay, bred by W. F. Sheddin, Cropstone, Leicester; s. Hanover Square, d. Mab 2nd 4335.
- 273 IV. (£4).—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, for Princess, brown, bred by Mr. Parker, Rufforth, York; s. Selby Royal.
- 264 R. N. & H. C.—DAVID DAVIES, M.P., Brouerion, Llandinam, for Florodoro 2nd.

Class 31.—*Hunter Fillies, foaled in 1910.* [7 entries, 3 absent.]

- 275 I. (£20).—SIR MERRIK R. BURRELL, BT., Knepp Castle, Horsham, for Sunray 4046, chestnut; s. Red Heart, d. Surrenden 3751 by Decider.
- 279 II. (£10).—MARY, DUCHESS OF HAMILTON, Easton Park, Wickham Market, for Cherry Brandy 2nd 4123, chestnut; s. St. Jacques, d. Mama 4191 by Munchausen.
- 278 III. (£5).—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for Bouncey Bella 4306, brown; s. Flambeau 67, d. Falmouth Belle.
- 280 R. N. & H. C.—EDWARD HODGSON, The Hollows, Bridlington, for Trilby 2nd.

¹ £100 and £50 towards these Prizes were given by two Members of the R.A.S.E. interested in the breeding of Hunters.

² Champion Gold Medal given by the Hunters' Improvement Society for the best Filly not exceeding three years old, in Classes 30-32, which is registered with a number in the Hunter Stud Book.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 32.—Hunter Fillies, foaled in 1909. [5 entries, none absent.]

- 284 I. (£20, & R. N. for Champion.¹)—EDWARD HODGSON, The Hollows, Bridlington, for *Barmaid* 2nd 3824, bay, bred by Peter Rourke; s. Sir Hugo, d. *bu* Tynan.
 282 II. (£10.)—GEORGE FARRINGTON, Billham Grange, Doncaster, for *Freedom*, brown, bred by Mr. Smith, Almholme, Doncaster; s. Dromonby, d. *by* Doncaster.
 281 III. (£5.)—ARTHUR S. BOWLBY, Gilston Park, Harlow, for *War Lady* 3788, bay, bred by Gilbert Robinson, Hinwick Hall, Wellingborough; s. Red Sahib 75, d. Bellona *by* Thurles.
 285 R. N. & H. C.—WILLIAM SEVERS, Wilstrop Hall, Green Hammerton, York, for *Actress* 7th.

Class 33.—Thoroughbred Mares, entered or eligible for entry in the General Stud Book, with Foals at foot, up to weight. [10 entries, 3 absent.]

- 291 I. (£20, & Champion.²)—LORD MIDDLETON, Birdsall, Malton, for *Fair Geraldine* (vol. 19, p. 744 G.S.B.), bay or brown, foaled in 1901, bred by Mrs. Ryan, Ireland; s. Desmond, d. De Estella *by* Lord Gough. [Foal *by* Stickup.]
 294 II. (£10, & S. P.³)—WILLIAM H. SHIERS, The Red House, Hartford, Cheshire, for *Nuptial* 3611, bay, foaled in 1902, bred by S. Nevins Bankart, Hullaton Hall, Uppingham; s. Nunthorpe, d. Katberg *by* Donovan. [Filly foal *by* Billidere (vol. 21, p. 269).]
 293 III. (£5, & S. P.³)—ERNEST W. ROBINSON, Liscombe, Leighton Buzzard, for *Vademecum* (vol. 21, p. 848 G.S.B.), brown, foaled in 1903, bred by R. Downes; s. Hackler (vol. 17, p. 251 G.S.B.), d. Verily (vol. 21, p. 848 G.S.B.) *by* Stylites. [Colt foal *by* Common.]
 289 R. N. & H. C.—GEORGE GODSON, Asgarby, Sleaford, for *Eventual*.

Class 34.—Hunter Mares (Novice), foaled in or after 1904, with Foals at foot, up to from 12 to 14 stone. [3 entries, 2 absent.]

- 296 I. (£20.)—LORD HAWKE, Wighill Park, Tadcaster, for *Venes*, grey, foaled in 1905; d. Starlight *by* Not Out. [Foal *by* Berrill.]

Class 35.—Hunter Mares (Novice), foaled in or after 1904, with Foals at foot, up to more than 14 stone. [4 entries, none absent.]

- 302 I. (£20.)—THOMAS & HENRY WARD, Pinchinthorpe, Great Ayton, for *Vixen* 2nd 4047, bay, foaled in 1906, bred by James Hammond, Moira, Ireland; s. Jerkin, d. *Vixen by* Bull's Eye. [Foal *by* Red Hall 2nd.]
 300 II. (£10.)—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for *Flash Lady*, brown, foaled in 1906, bred by Charles Brereton, Weasenham, Norfolk; s. Master Lovat. [Foal *by* Sea Bath.]
 301 III. (£5.)—THOMAS MASON, Misterton, Gainsborough, for *Polly*, bay, foaled in 1906; s. Beckenham Squire, d. Fanny *by* Silver King. [Foal *by* Abbot's Abode.]

Class 36.—Hunter Mares with Foals at foot, up to from 12 to 14 stone.

[15 entries, 4 absent.]

- 314 I. (£20.)—ERNEST W. ROBINSON, Liscombe, Leighton Buzzard, for *Partridge* 2nd 3618, chestnut, aged, bred by Edward Dempsey, Ballytaisneg, Mullinevat, Co. Kilkenny; s. Young Marden (vol. 17, p. 941, G.S.B.), d. Poll *by* Lord Raglan. [Foal *by* Wales (vol. 18, p. 854, G.S.B.).]
 317 II. (£10.)—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, for *Redbreast* 3676, chestnut, foaled in 1889, bred by Mr. Andrew, Elm House Farm, Northallerton; s. Red Eagle. [Foal *by* Billidere.]
 306 III. (£5.)—FREDERICK HARDY, Staunton Hall, Nottingham, for *Melrose* 2nd 4023, bay, foaled in 1902, breeder unknown. [Foal *by* Wales (vol. 18, p. 854, G.S.B.).]
 309 IV. (£4.)—LORD MIDDLETON, Birdsall, Malton, for *Griffenrath* 2703, dark bay, foaled in 1895, bred by Thomas Shaw, Barberstown, Straffan, Co. Kildare; s. Hackler (vol. 15, p. 251), d. *by* Durham. [Foal *by* Wales (vol. 18, p. 854, G.S.B.).]
 308 R. N. & H. C.—EDWARD HODGSON, The Hollows, Bridlington, for *Black Princess*.

Class 37.—Hunter Mares with Foals at foot, up to more than 14 stone.

[6 entries, 2 absent.]

- 318 I. (£20, & R. N. for Champion.²)—SIR MERRIK R. BURRELL, BT., Knepp Castle, Horsham, for *Casual* 4080, bay, foaled in 1901, bred by the Earl of Lonsdale, Barleythorpe, Oakham; s. Castlenock, d. Sister Mary *by* Brown Prince. [Foal *by* Hanover Square.]

¹ Champion Gold Medal given by the Hunters' Improvement Society for the best Filly not exceeding three years old, in Classes 30-32, which is registered with a number in the Hunter Stud Book.

² Champion Gold Medal given by the Hunters' Improvement Society for the best Mare, four years and upwards, in Classes 33 and 37, which is registered with a number in the Hunter Stud Book.

³ Two Special Prizes of £5 were given for the best Colt and the best Filly Foals.

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[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 322 **II. (£10.)**—MRS. SOFER-WHITBURN, Addington Park, West Malling, Kent, for **Erin** 3390, bay, foaled in 1887. [Foal by Hanover Square.]
 320 **III. (£5.)**—MRS. H. D. GREENE, Grove, Craven Arms, for **Stormy Petrol** 2nd 4186, brown, foaled in 1905, bred by R. G. Carden, Fishmoynce, Co. Tipperary; s. Faute-de-Mieux (vol. 18, p. 537 G.S.B.), d. Wild Duck 3031 by King Otto (vol. 16, p. 760 G.S.B.). [Foal by The Baker.]
 321 **R. N. & H. C.**—MISS A. W. HIGNETT, Otley Ley, Crewe, for **Diana**.

Class 38.—*Hunter Colt Foals, the produce of Mares entered in Classes 34 to 37.*
 [6 entries, 1 absent.]

- 327 **I. (£10.)**—LORD HAWKE, Wighill Park, Tadcaster, for **White Socks**, chestnut, foaled April 16; s. Berrill, d. Venes.
 328 **II. (£5.)**—THOMAS MASON, Misterton, Gainsborough, for bay, foaled April 21; s. Abbot's Abode, d. Polly by Beekingham Squire.
 329 **III. (£3.)**—LORD MIDDLETON, Birdsall, Malton, for brown, foaled March 26; s. Stickup, d. Maggie by Gordon.
 325 **R. N. & H. C.**—FREDERICK HARDY, Staunton Hall, Nottingham.

Class 39.—*Hunter Filly Foals, the produce of Mares entered in Classes 34 to 37.*
 [18 entries, 5 absent.]

- 342 **I. (£10.)**—FRANCIS SAMUELSON, Breckenbrough Hall, Thirsk, for chestnut, foaled March 9; s. Drummer Kelly, d. Mullingar Junior 3594 by Trundle Hill.
 333 **II. (£5.)**—R. L. FENWICK, Little Belvoir, Melton Mowbray, for bay, foaled April 5; s. Easthorpe, d. May Queen 2nd 3554 by May Boy.
 330 **III. (£3.)**—CAPTAIN CLIVE BEHRENS, Swinton Grange, Malton, for chestnut, foaled April 23; s. Berrill, d. Selby 3714 by Selby (vol. 15, p. 357).
 339 **R. N. & H. C.**—LORD MIDDLETON, Birdsall, Malton.

Polo and Riding Ponies.¹

Class 40.—*Polo and Riding Pony Stallions, foaled in or before 1909, not exceeding 15 hands.* [11 entries, 1 absent.]

- 349 **I. (£15, & Champion.²)**—JOHN BELL, Middleton Cottage, Newmarket, for **Naval Scare** 595, chestnut, foaled in 1908, bred by Lady de Bathe; s. Merman, d. Petty Cash by Aurum 2nd.
 348 **II. (£10, & R. N. for Champion.²)**—SIR JOHN BARKER, BT., The Grange, Bishop's Stortford, for **Arthur D** 593, bay, foaled in 1908, bred by R. Botterill; s. Pride, d. Maquay by Florentine.
 352 **III. (£5.)**—THE KEYNSHAM STUD COMPANY, LTD., Keynsham, near Bristol, for **White Wings** 464, dark chestnut, foaled in 1906, bred by the Radnorshire Polo and Riding Pony Co., Ltd., Bledfa, Llangunllo; s. White Mask 190, d. First Flight 615 by Balquihidar.
 354 **R. N. & H. C.**—STEPHEN MUMFORD, Stud Farm, Moreton Morrell, Warwick, for **Spanish Hero**.

Class 41.—*Polo and Riding Pony Colts, Fillies, or Geldings, foaled in 1911.*
 [9 entries, none absent.]

- 359 **I. (£15.)**—SIR JOHN BARKER, BT., The Grange, Bishop's Stortford, for **Sunray**, (Supp. 1912), chestnut colt; s. Othrae 447, d. Sunshade 1637.
 367 **II. (£10.)**—H. WHITWORTH, Scarborough Hall, Beverley, for dark brown gelding; s. Field Marshall 512, d. Trilby.
 362 **III. (£5.)**—EDWARD HURTLEY, Elmtrees, Sutton-on-Hull, for **Freda** (Supp. 1911), chestnut filly; s. Field Marshal 572, d. Belinda.
 364 **R. N. & H. C.**—RICHARD PAYNE, Newhill Hall, West Melton, for **Marchioness**.

Class 42.—*Polo and Riding Pony Colts, Fillies, or Geldings, foaled in 1910.*
 [13 entries, none absent.]

- 368 **I. (£15.)**—SIR JOHN BARKER, BT., The Grange, Bishop's Stortford, for **Sandileto** (Supp. 1911), bay colt; s. Sandiway 121, d. Leto 1759 by Best Man.
 374 **II. (£10.)**—TRESHAM GILBEY, Whitehall, Bishop's Stortford, for **Forward Trixie**, (Supp. 1911), bay filly; s. Right Forward 368, d. Patricia 1774.
 373 **III. (£5.)**—J. E. WILLIS FLEMING, Chilworth Manor Stud, Romsey, Hants, for **Romance** 2nd (Supp. 1910), chestnut filly; s. Rajah 417, d. Wonder by Isosceles.
 379 **IV. (£4.)**—HARRY WASPE, Manor Farm Stud, West Wickham, Cambs., for **Merry Amazon**, bay filly, bred by Sir John Barker, BT., The Grange, Bishop's Stortford; s. Merry Matchmaker, d. Amazon.
 372 **R. N. & H. C.**—H. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge, for **The Little White Knight**.

¹ £30 towards these Prizes were given by the Polo and Riding Pony Society.

² Champion Gold Medal given by the Polo and Riding Pony Society for the best Stallion or Colt in Classes 40-42.

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[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 43.—*Polo and Riding Pony Fillies or Geldings, foaled in 1909.*

[8 entries, 1 absent.]

- 381 I. (£15.)—SIR JOHN BARKER, BT., The Grange, Bishop's Stortford, for **Redown**, dark chestnut gelding; s. Othrae 447, d. Redoute 302.
 388 II. (£10.)—HARRY WASPE, Manor Farm Stud, West Wickham, Cambs., for **Pix**, chestnut gelding, bred by Sir John Barker, BT., The Grange, Bishop's Stortford; s. Sandiway 121, d. Pixie 1615 by Marmiton.
 384 III. (£5.)—H. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge, for **Best Gown** (1909-11), chestnut filly, bred by The Keynsham Stud Co., Ltd., Keynsham, Bristol; s. Gown Boy 114, d. Oh My 2nd 1000 by Mootrub 32.
 387 R. N. & H. C.—C. HOWARD TAYLOR, Hampole Priory, Doncaster, for **Middlewood**.

Class 44.—*Polo and Riding Pony Mares, with Foals at foot, not exceeding 14·2 hands.* [6 entries, 1 absent.]

- 393 I. (£15, & Champion.¹)—TRESHAM GILBEY, Whitehall, Bishop's Stortford, for **Patricia** 1774, chestnut, aged. [Foal by Bold Marco 352.]
 389 II. (£10, & R. N. for Champion.¹)—SIR JOHN BARKER, BT., The Grange, Bishop's Stortford, for **Killarney** 2nd 2068, chestnut, aged, breeder unknown. [Foal by Othrae 447.]
 392 III. (£5.)—H. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge, Kent, for **Ashorne** 1563, black, foaled in 1899. [Foal by Spanish Hero 372.]
 390 R. N. & H. C. & B. M.²—SIR JOHN BARKER, BT., for **Silver Star**.

Cleveland Bays or Coach Horses.

Class 45.—*Cleveland Bay or Coaching Stallions, foaled in or before 1908.*

[5 entries, 1 absent.]

- 398 I. (£15, & Champion.³)—GEORGE SCOBY, Beadlam Grange, Nawton, for **King George** 5th (Cleveland Bay), foaled in 1906, bred by the Earl of Feversham, Duncombe Park, Helmsley; s. Sparrow Hall Favourite 1561, d. Sweet Violet 1234 by Sultan 667.
 390 II. (£10, & R. N. for Champion.⁴)—FRANK H. STERICKER, Westgate House, Pickering, for **Breaston Prince** 2451 (Coaching), foaled in 1900, bred by W. Watson, Breaston, Derbyshire; s. Beacon Prince 2227, d. Zuleika 555 by Sultan 1565.
 396 III. (£5.)—GEORGE BURTON, Thorpe Willoughby, Selby, for **Knight of the Garter** 2460 (Coaching), foaled in 1904; s. Royal Knight 2155, d. Duchess of York by Willoughby Prince 1523.
 395 R. N. & H. C.—WILLIAM BRISBY, Cornborough Grange, Sherriff Hutton, York, for **Lord Dalby**.

Class 46.—*Cleveland Bay or Coaching Stallions, foaled in 1909 or 1910.*

[9 entries, none absent.]

- 407 I. (£15, & Champion.⁴)—FRANK H. STERICKER, Westgate House, Pickering, for **Renown** 2527 (Coaching), foaled in 1909, bred by M. Duck, Fairhead, Grosmont; s. Breaston Prince 2451, d. Daisy 1184 by Pitch and Toss 2336.
 404 II. (£10.)—GEORGE SCOBY, Beadlam Grange, Nawton, for **Beadlam Saxon** (Coaching), foaled in 1909, bred by the Earl of Feversham, Duncombe Park, Helmsley; s. Rosedale 1632, d. Beadlam Violet by Sultan 667.
 405 III. (£5.)—FRANK H. STERICKER, for **Kingsclere** 2529 (Coaching), foaled in 1910, bred by G. Purdon, Spaldington, Howden; s. Radium 2436, d. Graceful 1133 by Beacon Prince 2227.
 402 R. N. & H. C.—JOHN LETT, Cleveland Stud Farm, Rillington, York, for **Rillington Victor** 2536 (Coaching).

Class 47.—*Cleveland Bay or Coaching Fillies or Geldings, foaled in 1910.*

[2 entries.]

- 410 I. (£15, & R. N. for Champion.⁵)—JOHN WEBSTER, Cross House, Harome, Nawton, for **Harome Beauty** 1182 (Coaching filly); s. Breaston Prince 2451, d. Belle of Harome 2nd 1105 by Lord Mischief 2288.

¹ Champion Gold Medal given by the Polo and Riding Pony Society for the best Mare or Filly in Classes 41-44.

² Bronze Medal given by the Polo and Riding Pony Society for the best foal in Class 44, entered or eligible for entry in the Polo and Riding Pony Supplement.

³ Champion Prize of £5 given by the Cleveland Bay Horse Society for the best Cleveland Bay Stallion in Classes 45 and 46.

⁴ Champion Prize of £5 given by the Yorkshire Coach Horse Society for the best Coach Horse Stallion in Classes 45 and 46.

⁵ Champion Prize of £5 given by the Yorkshire Coach Horse Society for the best Coach Horse Mare or Filly in Classes 47-49.

Award of Live Stock Prizes at Doncaster, 1912. lix

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 409 II. (£10).—CHRISTOPHER FOXTON, Stillingfleet Hill, York, for **Queen Mary** 1187 (Coaching filly); s. Breaston Prince 2451, d. Fairy Queen 1151 *by* Royal Knight 2155.

Class 48.—*Cleveland Bay or Coaching Fillies or Geldings, foaled in 1909.*

[4 entries.]

- 414 I. (£15).—SYLVESTER LEAF & SONS, Glade Farm, Escrick, for **Royal Fashion** (Coaching gelding), bred by G. Purdon, Johnston's Farm, Spaldington, Howden; s. Radium 2436, d. Graceful 1133 *by* Beacon Prince 2227.
411 II. (£10).—R. DUTTON, Bilton Grange, Tockwith, York, for **Bilton Prince** (Coaching gelding); s. Breaston Prince 2451, d. Georgeina *by* May Day.
412 III. (£5, & Champion.¹)—GEORGE ELDERS, Toft House Farm, Aislaby, Sleights, Yorks, for **Aislaby Starlight** 1338 (Cleveland Bay filly); s. Aislaby Pride 1697, d. Hawthorn Darling 1294 *by* King Fred 1523.
413 R. N. & H. C.—BERT KITCHING, Hungate House, Pickering, for **Peerless**.

Class 49.—*Cleveland Bay or Coaching Mares, with Foals at foot.*

[3 entries.]

- 417 I. (£15, & Champion.²)—JOHN LETT, Cleveland Stud Farm, Rillington, York, for **Rillington Attraction** (Coaching), foaled in 1906; s. Special Delight 2390, d. Heroine 971 *by* Lucky Hero. [Foal *by* Cholderton Luck 2517.]
416 II. (£10).—GEORGE ELDERS, Toft House Farm, Aislaby, Sleights, Yorks, for **Woodland Starlight** 1153 (Coaching), foaled in 1908, bred by G. Grandage, Moor Croft, Yeadon, Leeds; s. Woodland Pride 1659, d. Woodland Briar 1318 *by* King of the East 1525. [Foal *by* Breaston Prince 2451.]
415 III. (£5).—F. H. CARR, Hexby House, Hexby Bridge, York, for **Lady Carlisle** 1057 (Coaching), foaled in 1903; s. Primrose Carlisle 2325, d. Princess May 582 *by* Surprise 1497. [Foal *by* Breaston Prince 2451 or Markham.]

Hackneys.³

Class 50.—*Hackney Stallions, foaled in 1911.* [9 entries, 2 absent.]

- 423 I. (£20).—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for **Romping Tony**, chestnut roan; s. Antonius 10559, d. Gallant Girl 15092 *by* Revival 7236.
418 II. (£10).—JOHN BEAL, Blanch, North Dalton, Driffield, for **Blanch King George**, chestnut; s. King of the East 10725, d. Blanch Gay Girl 18029 *by* Hunmanby Duke 7877.
425 III. (£5).—F. J. STEPHENSON, Wandale Farm, Bridlington, for **Wandale Premier**, chestnut; s. King of the East 10725, d. Lady Wandale 21496 *by* Polonius 4931.
426 R. N. & H. C.—ROBERT WHITWORTH, Londesborough Stud, Market Weighton, for **Jeweller**.

Class 51.—*Hackney Stallions, foaled in 1910.* [22 entries, 1 absent.]

- 442 I. (£20, & R. N. for Champion.⁴)—WALTER W. RYCROFT, Drake Hill Hackney Stud, Bingley, for **Admiral Cliquot** 11667, chestnut, bred by W. R. Lysaght, Castleford, Chestow; s. Leopard 9783, d. Hopwood Clematis 15876 *by* Rosador 4964.
429 II. (£10).—FRANK J. BATCHELOR, Hopwood, Alvechurch, for **Hopwood King** 11804, chestnut, bred by Sir Lees Knowles, Bart., C.V.O., Pendlebury, Manchester; s. Admiral Crichton 9578, d. Ryburn Lucinda 17696 *by* Ganymede 2076.
445 III. (£5).—W. J. TENNANT, Carleton, Pontefract, for **Beauty's Sensation** 11691, dark chestnut; s. Rosador 4964, d. Special Beauty 18608 *by* Royal Danegelt 5785.
433 IV. (£4).—R. A. DE MANCHA, Waterside, Frogmore, St. Albans, for **Ver Matador** 11903, chestnut; s. Kirkburn Toreador 8534, d. Modest Kate 5882 *by* Rufus.
444 V. (£4).—ROBERT SURFLEET, The Limes, Beckingham, Gainsborough, for **Beckingham Royal** 11694, chestnut roan; s. Polonius 4931, d. Miss Helmsley 12053 *by* Danebury 4724.
434 R. N. & H. C.—MRS. FLETCHER & SONS, The Grange, Angram, Yorks, for **Angram Flash Admiral**.

Class 52.—*Hackney Stallions, foaled in 1909.* [10 entries, none absent.]

- 452 I. (£20, & Champion.⁴)—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for **Sparkling Danegelt** 11576, chestnut; s. Royal Danegelt 5785, d. Polly Olga 18499 *by* Rosador 4964.
449 II. (£10).—T. BLAZIER, Fern House, Edinburgh Street, Hull, for **B. B. Sure** 11689, chestnut; s. Rosador 4964, d. Watercress 8568 *by* Lord Derby Junior 3742.

¹ Champion Prize of £5 given by the Cleveland Bay Horse Society for the best Cleveland Bay Mare or Filly in Classes 47-49.

² Champion Prize of £5 given by the Yorkshire Coach Horse Society for the best Coach Horse Mare or Filly in Classes 47-49.

³ £75 towards the Prizes for Hackneys and Hackney Ponies were given by the Hackney Horse Society.

⁴ Champion Gold Medal given by the Hackney Horse Society for the best Stallion in Classes 50-52.

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[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 457 **III. (£5.)**—ROBERT SURFLEET, The Limes, Beckingham, Gainsborough, for **Beckingham Viceroy** 11345, dark chestnut; s. Hopwood Viceroy 9280, d. Miss Helmsley 12953 *by* Danebury 4724.
- 455 **IV. (£4.)**—WALTER W. RYCROFT, Drake Hill Hackney Stud, Bingley, for **Salford Commander** 11558, dark chestnut, bred by A. D. Oates, Ryburn Stud, Halifax; s. Hopwood Viceroy 9280, d. Ryburn Lucinda 17696 *by* Ganymede 2076.

Class 53.—Hackney Fillies, foaled in 1911. [9 entries, 1 absent.]

- 466 **I. (£20.)**—ROBERT SURFLEET, The Limes, Beckingham, Gainsborough, for **Beckingham Lady Gracious**, chestnut; s. Beckingham Squire 8070, d. Miss Helmsley 12953 *by* Danebury 4724.
- 460 **II. (£10.)**—C. EDWARD E. COOKE, Bygrave, near Baldoek, for **Bygrave St. Agatha**, chestnut; s. Kirkburn Toreador 8534, d. St. Agatha 15400 *by* Garton Duke of Connaught 3009.
- 463 **III. (£5.)**—JOHN S. HIGNETT, Stud Farm, Kenton, Middlesex, for **Lonely Lass**, chestnut; s. Polonius 4931, d. Princess Danilo *by* Dan Leno 8436.
- 465 **R. N. & H. C.**—H. V. SHERINGHAM, South Creake, Fakenham, for **Creake Royal Princess**.

Class 54.—Hackney Fillies, foaled in 1910. [11 entries, 2 absent.]

- 468 **I. (£20.)**—ERNEST BEWLEY, Danum, Rathgar, co. Dublin, for **Woodhatch Sunflower** 22307, chestnut, bred by R. P. Evans, Woodhatch House, Reigate; s. Polonius 4931, d. Woodhatch Iris 17859 *by* Garton Duke of Connaught 3009.
- 475 **II. (£10.)**—CHARLES ROBINSON, Arthington Stud Farm, Arthington, near Leeds, for **Arthington Princess**, chestnut; s. Brave Danegelt 7717, d. Garton Princess 17331 *by* Rosador 4964.
- 477 **III. (£5.)**—ROBERT SURFLEET, The Limes, Beckingham, Gainsborough, for **Beckingham Lady Crichton** 21860, chestnut; s. Admiral Crichton 9578, d. Beckingham Polly Helmsley 17121 *by* Polonius 4931.
- 473 **IV. (£4.)**—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for **Bouncey Girl** 21883, chestnut roan; s. Antonius 10559, d. Gallant Girl 15093 *by* Revival 7236.
- 478 **R. N. & H. C.**—DAVID S. TAYLOR, Nether Elms, Nafferton, for **Nether Coronation**.

Class 55.—Hackney Fillies, foaled in 1908. [14 entries, 5 absent.]

- 489 **I. (£20, & R. N. for Champion.¹)**—W. BURNELL TUBES, The Paddocks, Mill Hill, London, N.W., for **The Whip** 21707, chestnut; s. Leopard 9783, d. Terrington Leah 18665 *by* Goldfinder 6th 1791.
- 488 **II. (£10.)**—W. J. TENNANT, Carleton, Pontefract, for **Carleton Beauty** 21919, dark chestnut; s. Rosador 4964, d. Special Beauty 18608 *by* Royal Danegelt 5785.
- 483 **III. (£5.)**—H. HINRICHSSEN, Booth's Hall, Knutsford, for **Pavlova** 22180, chestnut, bred by G. & W. Stephenson, Catwick, Hull; s. Polonius 4931, d. May Burton 13752 *by* Chocolate Junior 4185.
- 480 **IV. (£4.)**—JOHN CONCHAR, Wylde Green, Birmingham, for **Warwick Ophelia** 21736, chestnut; s. Polonius 4931, d. Ewell Belinda 16602 *by* Goldfinder 6th 1791.
- 479 **R. N. & H. C.**—HENRY B. BRANDT, Capenor, Nutfield, for **Belle Mère**.

Class 56.—Hackney Mares, with Foals at foot, over 14, and not exceeding 15·2 hands. [7 entries, 1 absent.]

- 496 **I. (£20.)**—H. HINRICHSSEN, Booth's Hall, Knutsford, for **Hopwood Clematis** 15876, dark chestnut, foaled in 1902, bred by F. J. Batchelor, Hopwood, Alvechurch; s. Rosador 4964, d. Muriel 2340 *by* Cadet 1251. [Foal *by* Kirkburn Toreador 8534.]
- 493 **II. (£10.)**—DR. ALEX. BOWIE, The Bowie Pedigree Stud, Colnbrook, Bucks, for **Memento** 12930, chestnut, foaled in 1898, bred by A. W. Jackson, Market Weighton; s. Polonius 4931, d. Katie 3981 *by* Merry Heart 1521. [Foal *by* Mathias A1 10751.]
- 494 **III. (£5.)**—JOHN E. BUCKLEY, The Sycamores, Greenfield, Yorks, for **Gay Duchess** 9975, chestnut, foaled in 1895, bred by Sir Walter Gilbey, Bt., Elsenham Hall, Essex; s. Danegelt 174, d. Duchess 1083 *by* Norfolk Gentleman 492. [Foal *by* Mooredale Wildfire 10326.]
- 499 **R. N. & H. C.**—T. R. STORK, Westfield, Foston-on-the-Wolds, Driffield, for **Brigham Ruby**.

Class 57.—Hackney Mares, with Foals at foot, over 15·2 hands. [7 entries, 1 absent.]

- 500 **I. (£20, & Champion.¹)**—FRANK J. BATCHELOR, Hopwood, Alvechurch, for **Beckingham Lady Grace** 18902, dark chestnut, foaled in 1906, bred by Robert Surfleet, The Limes, Beckingham, Gainsborough; s. Beckingham Squire 8070, d. Beckingham Lady Helmsley 14919 *by* Garton Duke of Connaught 3009. [Foal *by* Evanthis 8463.]

¹ Champion Gold Medal given by the Hackney Horse Society for the best Mare or Filly in Classes 53-57.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 503 **II. (£10.)**—R. A. DE MANCHA, Waterside, Frogmore, St. Albans, for **Bashful Kate** 14914, chestnut, foaled in 1901, bred by John Harrison, Garton-on-the-Wolds; s. Rosador 4964, d. Modest Kate 5882 by Rufus 1343. [Foal by Polonius 4931.]
 502 **III. (£5.)**—JAMES COLBY, Thornthorpe Manor, Malton, for **Thornthorpe Rosemary** 19595, chestnut roan, foaled in 1906; s. St. Thomas 7261, d. Thornthorpe Sweet Lavender 15477 by Garton Duke of Connaught 3009. [Foal by King of the East 10725.]
 504 **R. N. & H. C.**—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for **Spring Day**.

Class 58.—*Hackney Foals, the produce of Mares in Classes 56 or 57.*

[14 entries, 2 absent.]

- 514 **I. (£10.)**—JOHN S. HIGNETT, Stud Farm, Kenton, Middlesex, for chestnut colt, foaled Feb. 16; s. Mathias A1 10751, d. Dagmar's Pride 15024 by Connaught 1453.
 513 **II. (£5.)**—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for chestnut filly, foaled April 7; s. Royal Danegelt 5785, d. Spring Day 20252 by His Majesty 2513.
 508 **III. (£3.)**—DR. ALEX. BOWIE, The Bowie Pedigree Stud, Colnbrook, Bucks, for chestnut colt, foaled April 18; s. Mathias A1 10751, d. Memento 12930 by Polonius 4931.
 515 **R. N. & H. C.**—H. HINRICHSSEN, Booth's Hall, Knutsford.

Hackney Ponies.¹

Class 59.—*Hackney Pony Stallions, foaled in or before 1909, not exceeding 14 hands.* [7 entries, 1 absent.]

- 521 **I. (£15.)**—JOSHUA BALL, Southworth Hall, Warrington, for **Southworth Swell** 11219, bay, foaled in 1907, bred by E. W. Sankey, Croft, Lanes.; s. Pinderfields Horace 7952, d. Tilston Maid 16278 by Berkeley Model 3663.
 522 **II. (£10.)**—A. R. FISH, Holme Mead, Hutton, Preston, for **Penwortham Pippin**, brown, foaled in 1908, bred by H. Stacey, Appleby, Doncaster; s. Sir Horace 5402, d. Mel-Valley Birthday 14570 by Sir Horace 5402.
 526 **III. (£5.)**—D. R. THOMAS, Tanyrallt Pony Stud, Talybont, for **Tanyrallt Fireboy** 11229, bay, foaled in 1908, bred by O. T. Price, Brokenhurst; s. Fire Boy 7440, d. Lyndhurst Paula 16780 by Tissington Horace 7653.
 524 **R. N. & H. C.**—MISS LANGWORTHY, Hendens Manor, Holyport, Berks, for **Holyport Pinfire**.

Class 60.—*Hackney Pony Colts, Fillies, or Geldings, foaled in 1910, not exceeding 13·2 hands.* [5 entries, 1 absent.]

- 528 **I. (£15.)**—ALBERT HUMPHREY, Morton, Gainsborough, for **Shinfield Antelope**, bay filly, bred by Frank Bateman, The Lodge, Shinfield, Reading; s. Lyndhurst Phosphorus 8842, d. Tissington Sleet 17801 by Hail Storm 8178.
 529 **II. (£10.)**—JOHN JONES & SONS, Dinarth Hall Pony Stud, Colwyn Bay, for **Trillo Swell**, bay colt; s. Julius Cæsar 2nd 5666, d. Berry Hill Sniff 12453 by Prospector 6516.
 532 **III. (£5.)**—ALBERT H. ROBERTS, Gainsborough, for **Gainsboro Fire Boy**, bay colt, bred by Thomas Needham, Walkerith; s. Little Fire 10735, d. Berkeley Gem by Mel-Valley Wonder.
 530 **R. N. & H. C.**—WILLIAM MASON, Huntington Hall, Chester, for **Glenavon Torrid**.

Class 61.—*Hackney Pony Fillies or Geldings, foaled in 1909, not exceeding 13·3 hands.* [5 entries, none absent.]

- 534 **I. (£15.)**—W. FOSTER, Mel-Valley, Moseley, Worcs., for **Mel-Valleys Fame**, bay gelding, bred by Walter Cliff, Melbourne Hall, York; s. Royal Success 8905, d. Wortley Belle 14873 by Sir Horace 5402.
 533 **II. (£10.)**—JAMES E. AGATE, The Links, Chapel-en-le-Frith, for **Talke Princess** 21695, bay filly, bred by W. Wainwright & Sons, Talke Pony Stud, Stoke-on-Trent; s. Talke Fire King, 9932, d. Royal Magic 13893 by Dane Royal 5575.
 535 **III. (£5.)**—MISS EUGAIN LORT, Castlemai, Carnarvon, for **Bright Idea** 21896, bay filly, bred by John Jones and Sons, Colwyn Bay; s. Magpie's Danegelt 7183, d. Merry Hope 13762 by Sir Horace 5402.
 537 **R. N. & H. C.**—D. R. THOMAS, Tanyrallt Pony Stud, Talybont, for **Tanyrallt Little Firegirl**.

Class 62.—*Hackney Pony Mares, with Foals at foot, not exceeding 14 hands.* [3 entries, none absent.]

- 539 **I. (£15.)**—D. R. THOMAS, Tanyrallt Pony Stud, Talybont, for **Lyndhurst Paula** 16780, bay, foaled 1903, bred by Sir Gilbert Greenall, BT., Walton Hall, Warrington; s. Tissington Horace 7653, d. Merry Polly 8250 by Merry Sunshine 1523. [Foal by Tanyrallt Fireboy 11229.]
 540 **II. (£10.)**—WILLIAM WAINWRIGHT, The Pony Stud, Talke, Stoke-on-Trent, for **Talke Fire Queen** 20273, bay, foaled in 1907; s. Fireboy 7440, d. Royal Magic 13893 by Dane Royal 5575. [Foal by Talke Fire King 9932.]

¹ £75 towards the Prizes for Hackneys and Hackney Ponies were given by the Hackney Horse Society.

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Shetland Ponies.

Class 63.—*Shetland Pony Stallions, foaled in or before 1909, not exceeding 10½ hands.* [9 entries, 1 absent.]

- 548 **I.** (£10.)—R. W. R. MACKENZIE, Earlsall, Lenchars, Fife, for **Radnor Donaldo**, black foaled in 1908, bred by D. MacLennan, Radnor Hall, Elstree; s. Bismarck of Watford 441, d. Radnor Sparrow 2486 by Home Rule 184.
 549 **II.** (£5.)—WILLIAM MUNGALL, Transy, Dunfermline, for **Silverton of Transy** 519, black, foaled in 1906; s. Seaweed 333, d. Silver Queen 1197 by Oman 33.
 545 **III.** (£3.)—THE EARL OF LONSDALE, Whitehaven Castle, for **Minotaur**, black, foaled in 1908, bred by Miss Nichol, Roscobie, Banchory; s. Tip Top 432, d. Topsy 1768 by Odin 32.
 547 **R. N. & H. C.**—R. W. R. MACKENZIE, for **Bellrope of Earlsall**.

Class 64.—*Shetland Pony Mares, with Foals at foot, not exceeding 10½ hands.* [4 entries, 1 absent.]

- 553 **I.** (£10, & Champion.¹)—WILLIAM MUNGALL, Transy, Dunfermline, for **Thoralind** 2240, black, foaled in 1902, bred by the Dowager Marchioness of Linlithgow, Hopetoun, Fife; s. Multum in Parvo 28, d. Theo 1515 by Douglas 145. [Foal by Seaweed 333.]
 551 **II.** (£5, & R. N. for Champion.¹)—MRS. ETTA DUFFUS, Penniwells, Elstree, for **Floreat** 2447, dark brown, foaled in 1906, bred by the Hon. W. R. D. Forbes, Blythe House, Turriff; s. Rattler 210, d. Floss 1675 by Bonaparte 168. [Foal by Dragon of Earlsall.]
 550 **III.** (£3.)—LADY GERTRUDE CRAWFORD, Coxhill, Lymington, Hants, for **Buness**, brown, aged, bred by Mr. Edmonston, Unst, Shetland. [Foal by King Harold 8.]

Welsh Ponies.

Class 65.—*Welsh Pony Stallions, foaled in or before 1909, not exceeding 12 hands.* [4 entries.]

- 554 **I.** (£10, & Champion.²)—SIR WALTER GILBEY, BT., Elsenham Hall, Essex, for **Bledfa Shooting Star** 73, dark iron grey, foaled in 1901, bred by S. M. Wilmot, The Chalet, Alveston, R.S.O.; s. Dyoll Starlight 4, d. Alveston Belle 572 by Cymro.
 556 **II.** (£5.)—MRS. H. D. GREENE, Grove, Craven Arms, for **Grove Ballistite** 200, grey, foaled in 1903, bred by H. Meuric Lloyd, Delfryn, Llanwrda; s. Dyoll Starlight 4, d. Dyoll Bala Gal 65.
 555 **III.** (£3.)—MRS. H. D. GREENE, for **Grove Arclight** 413, grey, foaled in 1908, bred by Evan Jones, Caerwedros, South Wales; s. Greylight 80, d. Wedros Gem 3418 by Eiddwen Flyer 3rd 5.
 557 **R. N. & H. C.**—MRS. PHILIP HUNLOKE, Bucknell Manor, Bicester, for **Coronation Starlight**.

Class 66.—*Welsh Pony Mares, with Foals at foot, not exceeding 12 hands.* [6 entries, 1 absent.]

- 561 **I.** (£10, & Champion.³)—THE DUCHESS OF NEWCASTLE, Hardwick Grange, Clumber Park, Worksop, for **Clumber Blacky**, black, foaled in 1907; s. Linnel Don, d. Lady Jones 2nd by Linnel Don. [Foal by Hardwick Sensation.]
 562 **II.** (£5.)—THE DUCHESS OF NEWCASTLE, for **Clumber Janet**, grey, foaled in 1908; s. Hardwick Sensation, d. Janet. [Foal by Linnel Don.]
 559 **III.** (£3.)—MRS. H. D. GREENE, Grove, Craven Arms, for **Grove Dazzle** 1490, chestnut, foaled in 1903, bred by H. Meuric Lloyd, Delfryn, Llanwrda; s. Dyoll Starlight 4, d. Dyoll Dainty 955. [Foal by Grove Rainbow 345.]
 560 **R. N. & H. C.**—MISS EURGAIN LORT, Castlemai, Carnarvon, for **Blue Rock**.

Hunter Riding Classes.⁴

Class 67.—*Hunter Mares or Geldings, foaled in 1908, up to from 12 to 14 stone.* [18 entries.]

- 578 **I.** (£15.)—JOHN H. STOKES, Great Bowden, Market Harborough, for **Royal Mint**, brown gelding, bred by M. Kendall, Ness Hall, Nunnington, York; s. Selby Royal by Red Eagle.
 568 **II.** (£10.)—JOHN DRAGE, Chapel Brampton, Northampton, for **Golden Drop**, chestnut gelding.

¹ Champion Silver Medal given by the Shetland Pony Stud Book Society for the best Animal in Classes 63 and 64.

² Silver Medal given by the Welsh Pony and Cob Society for the best Stallion in Class 65.

³ Silver Medal given by the Welsh Pony and Cob Society for the best Mare in Class 66.

⁴ Prizes given by the Doncaster Local Committee.

Award of Live Stock Prizes at Doncaster, 1912. lxiii

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 576 **III.** (£5.)—JAMES MONTAGU, Burrough, Melton Mowbray, for **Silverwings**, grey gelding, bred by Carlo Haines, Mallow; s. Heston by Crackenthorpe.
 565 **IV.** (£5.)—JOHN BROWN, The Common, Kirby Moorside, for **Brown Prince**, brown gelding, bred by E. Warters, Duggleby, Malton; s. Oxus.
 581 **V.** (£5.)—FRANK B. WILKINSON, Cavendish Lodge, Edwinstowe, Newark, for **Tallyho**, bay gelding, bred by T. Cross, Marnham Hall, Newark; s. Mark For'ard.
 567 **R. N. & H. C.**—F. G. COLMAN, Little Burgh, Burgh Heath, Epsom, for **Rivulet**.

Class 68.—*Hunter Mares or Geldings, foaled in 1908, up to more than 14 stone.*
 [6 entries.]

- 585 **I.** (£15.)—SYLVESTER LEAF & SONS, Glade Farm, Escrick, for **Bayleaf**, dark bay gelding.
 587 **II.** (£10.)—T. L. WICKHAM-BOYNTON, Burton Agnes Hall, Driffield, for **Roy O'Neill**, brown gelding, bred by Mr. Turner, Lund, Beverley; s. Roe O'Neill, d. by Knight Templar.
 582 **III.** (£5.)—LT. COL. J. C. BIRDWOOD, Eversholt, Woburn, for **Ben**, brown gelding, bred by Miss E. Morgan, co. Cork; s. Panier, d. Black Bess by Speculation.
 584 **IV.** (£5.)—EDWARD HODGSON, The Hollows, Bridlington, for **Norah 5th**, chestnut mare, bred by F. Parker, Howsham, Yorks; s. Wales (vol. 18, p. 854 G.S.B.), d. by Walmsgate.
 583 **R. N. & H. C.**—COL. J. H. BURSTALL, Braffords, Cottingham, Hull.

Class 69.—*Hunter Mares or Geldings, Novice, foaled in or before 1907, up to from 12 to 14 stone.* [14 entries.]

- 590 **I.** (£15.)—JOHN DRAGE, Chapel Brampton, Northampton, for **Bloodstone**, chestnut gelding, foaled in 1906.
 591 **II.** (£10.)—JOHN DRAGE, for **John**, bay gelding, foaled in 1906.
 594 **III.** (£5.)—WILLIAM GALE, Waltham, Melton Mowbray, for bay gelding, foaled in 1906.
 598 **IV.** (£5.)—JOHN H. STOKES, Great Bowden, Market Harborough, for dark bay gelding, foaled in 1907.
 593 **V.** (£5.)—WILLIAM FRANK, Swansea House, Pickering, for **Aaron**, bay gelding, foaled in 1907.
 589 **R. N. & H. C.**—J. ERIC CLEGG, The Starkies, Bury, for **Shannon**.

Class 70.—*Hunter Mares or Geldings, Novice, foaled in or before 1907, up to more than 14 stone.* [8 entries.]

- 603 **I.** (£15. & **Champion**.¹)—JOHN DRAGE, Chapel Brampton, Northampton, for **Alarm**, brown gelding, foaled in 1906.
 604 **II.** (£10.)—JOHN DRAGE, for **Cork**, bay gelding, foaled in 1907.
 606 **III.** (£5.)—JOHN H. STOKES, Great Bowden, Market Harborough, for **Nutmeg**, grey gelding, foaled in 1907.
 605 **IV.** (£5.)—WILLIAM GALE, Waltham, Melton Mowbray, for chestnut gelding, foaled in 1905.
 602 **V.** (£5.)—JOHN BROWN, The Common, Kirby Moorside, for **Avelon**, bay gelding, foaled in 1907; s. Isle of Avelon.
 607 **R. N. & H. C.**—JOSEPH VERITY, Holywell, Swinton, Rotherham, for **Lottery**.

Class 71.—*Hunter Mares or Geldings, foaled in or before 1908, up to from 12 to 13·7 stone.* [16 entries.]

- 578 **I.** (£20.)—JOHN H. STOKES, for **Royal Mint**. (See Class 67.)
 591 **II.** (£15.)—JOHN DRAGE, for **John**. (See Class 69.)
 610 **III.** (£10.)—JOHN DRAGE, for **Woodpigeon**, grey gelding, foaled in 1904.
 594 **IV.** (£5.)—WILLIAM GALE. (See Class 69.)
 565 **V.** (£5.)—JOHN BROWN, for **Brown Prince**. (See Class 67.)
 598 **R. N. & H. C.**—JOHN H. STOKES. (See Class 69.)

Class 72.—*Hunter Mares or Geldings, foaled in or before 1908, up to more than from 13·7 and not more than 15 stone.* [17 entries.]

- 618 **I.** (£20. & **R. N. for Champion**.¹)—W. A. SIMPSON-HINCHLIFFE, 9 Park Parade Stables, Harrogate, for **Broadwood**, brown gelding, foaled in 1903, bred by the late J. Richardson, Saltown Manor, York; s. Red Eagle, d. by Selby.
 590 **II.** (£15.)—JOHN DRAGE, for **Bloodstone**. (See Class 69.)
 613 **III.** (£10.)—SIR MERRIK R. BURRELL, BT., Knepp Castle, Horsham, for **Kismet**, chestnut gelding, foaled in 1907, bred by the Duke of Grafton, K.G., Wakefield Lodge, Stony Stratford; s. Caedmon.
 576 **IV.** (£5.)—JAMES MONTAGU, for **Silverwings**. (See Class 67.)
 606 **V.** (£5.)—JOHN H. STOKES, for **Nutmeg**. (See Class 70.)
 614 **R. N. & H. C.**—E. LYCETT GREEN, Ashfield, York, for **Paleface**.

¹ Gold Challenge Cup given by gentlemen interested in Hunters for the best Mare or Gelding in Classes 67-73.

lxiv *Award of Live Stock Prizes at Doncaster, 1912.*

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 73.—*Hunter Mares or Geldings, foaled in or before 1908, up to more than 15 stone.* [10 entries.]

- 603 I. (£20.)—JOHN DRAGE, for **Alarm**. (See Class 70.)
 625 II. (£15.)—JOHN H. STOKES, Great Bowden, Market Harborough, for chestnut gelding, foaled in 1905.
 604 III. (£10.)—JOHN DRAGE, for **Cork**. (See Class 70.)
 626 IV. (£5.)—ARTHUR SOWLER, The Warren, Fimere, Buckingham, for **Guardsman**, bay gelding, foaled in 1907, bred by W. Brown, Slingsby, York; s. Knockabout.
 621 V. (£5.)—F. G. COLMAN, Little Burgh, Burgh Heath, Epsom, for **Cairo**, bay gelding, foaled in 1907; s. Riverstown, d. Homely Lass by Homely.

Hacks or Riding Ponies.¹

Class 74.—*Mares or Geldings, Hunter or Polo Type (light weight), foaled in or before 1908, not exceeding 15 hands.* [5 entries.]

- 627 I. (£15, & B.N. for **Champion**.²)—MISS MONA DUNN, Coombe Cottage, Kingston Hill, for **Sepire**, bay mare, foaled in 1906.
 630 II. (£10.)—GERALD LOUSADA, Warwick Lodge, Melton Mowbray, for **Bridget**, chestnut mare, foaled in 1905, breeder unknown.
 631 III. (£5.)—F. A. RICKABY, St. Nicholas Villa, Hull Road, York, for **King's Comfort**, chestnut mare, foaled in 1907.

Class 75.—*Mares or Geldings, Hunter or Polo Type (heavy weight), foaled in or before 1908, not exceeding 15 hands.* [7 entries.]

- 634 I. (£15.)—H. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge, for **Moleskin**, chestnut mare, foaled in 1907.
 637 II. (£10.)—J. NORBURY, Heathside, Knutsford, for **Peacock**, grey gelding, foaled in 1906, bred by J. Acton, Knutsford; s. Gentleman Joe.
 636 III. (£5.)—FRED MONEY, Silk Willoughby, Sleaford, for **Silkby Mischief**, bay gelding, foaled in 1906, bred by Dr. Stanton, Folkingham; s. Undecided.
 632 R. N. & H. C.—SIR JOHN BARKER, Bt., The Grange, Bishop's Stortford, for **Turtle**.

Class 76.—*Mares or Geldings, Park Hacks (light weight), foaled in or before 1908, exceeding 15 hands.* [9 entries.]

- 642 I. (£15, & **Champion**.²)—H. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge, for **The Chocolate Soldier**, chestnut gelding, foaled in 1907, bred by Sir John Barker, Bt., The Grange, Bishop's Stortford; s. Jew Boy, d. Lightning.
 641 II. (£10.)—MISS MONA DUNN, Coombe Cottage, Kingston Hill, for **Striker**, chestnut gelding, foaled in 1906.
 610 III. (£5.)—JOHN DRAGE, for **Woodpigeon**. (See Class 71.)
 644 R. N. & H. C.—EDWARD HODGSON, The Hollows, Bridlington, for **Penelope 2nd**.

Class 77.—*Mares or Geldings, Park Hacks (heavy weight), foaled in or before 1908, exceeding 15 hands.* [3 entries.]

- 649 I. (£15.)—MISS MONA DUNN, Coombe Cottage, Kingston Hill, for **Sunrise**, chestnut gelding, foaled in 1906.
 650 II. (£10.)—H. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge, for **Luck Number**, bay gelding, foaled in 1908.
 648 III. (£5.)—MISS MONA DUNN, for **Grey Mist**, grey gelding, foaled in 1907.

Driving Classes.¹

Class 78.—*Harness Mares or Geldings, Novices, not exceeding 14 hands.* [13 entries.]

- 534 I. (£15, & **Champion**.³)—W. FOSTER, for **Mel-Valley's Fame**. (See Class 61.)
 533 II. (£10, & R. N. for **Medal**.⁴)—JAMES E. AGATE, for **Talke Princess**. (See Class 61.)
 656 III. (£5.)—FREDERICK HARDWICK, The Hollies Farm, Over Peover, Knutsford, for **Lady Hardwick** 20803, bay mare, foaled in 1908; s. Sir Horace 5402, d. Burlington Jewel 14200 by Edemynag 5989.
 655 IV. (£5.)—ENOCH GLEN, Fallside Hackney and Pony Stud, Bathgate, N.B., for **Glenavon Firebrand**, brown gelding, foaled in 1907, bred by J. Ernest Kerr, Harviestoun Castle, Dollar; s. Fireboy 7440 d. Tissington Regina by Golden Rule.
 652 R. N. & H. C.—A. H. COOKE, Manor House, Marr, Doncaster, for **Marr Squire**.

¹ Prizes given by the Doncaster Local Committee.

² Gold Challenge Cup given by gentlemen interested in Hacks and Riding Ponies for the best Animal in Classes 74-77.

³ Gold Challenge Cup, given by gentlemen interested in Harness Horses, for the best Animal in the Novice Classes 78-80.

⁴ Gold Medal, given by the Hackney Horse Society for the best Mare or Gelding in Classes 78-84, the produce of a registered Hackney Stallion.

Award of Live Stock Prizes at Doncaster, 1912. lxv

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class 79.—*Harness Mares or Geldings, Novices, over 14 and not exceeding 15 hands.* [25 entries.]

- 670 I. (£15).—MRS. A. T. GORDON, Freefield, Insch, for **Queen of Scots**, brown filly, foaled in 1909, bred by W. J. Tennant, Carleton, Pontefract; s. Mathias 6473, d. Ter-rington Contra 13967 by Contest 1746.
 681 II. (£10).—PHILIP SMITH, Haddon House, Ashton-on-Mersey, for **Haddon Victor**, chestnut gelding, foaled in 1906, bred by W. J. Davey, Maesmyan Hall, Afonwen; s. His Majesty 2513, d. Terrington Wimble 16261 by Goldfinder 6th 1791.
 675 III. (£5).—THE EXORS. OF FRANK RILEY-SMITH, Barton Hall, Bury St. Edmunds, for **Barton Mystery**, chestnut mare, foaled in 1908, bred by the late Frank Riley-Smith; s. Polonius 4931, d. Inholms Mystery 8996 by Lord Hamlet 3750.
 676 IV. (£5).—MISS ELLA S. ROSS, Beechfield, Sale, Cheshire, for **Grand Vim** 10319, black gelding, foaled 1905, bred by R. C. Marshall, Burntshields, Kilbarchan; s. Mathias 6473, d. Rosetta 8426 by Lord Derby 2nd 417.
 664 R. N. & H. C.—J. SUMNER DRAPER, Milton, Mass., U.S.A., for **Baronet**.

Class 80.—*Harness Mares or Geldings, Novices, over 15 hands.* [25 entries.]

- 690 I. (£15, & R. N. for Champion.¹)—M. A. MARTINEZ DE HOZ, 12, Hobart Street, London, S.W., for **Gay Boy**, chestnut gelding, foaled in 1908; s. Marvellous 6124, d. Katherina 12767 by The Marquis 6122.
 694 II. (£10).—ALEXANDER GEMMELL, Wellington Hackney Stud, Ayr, for **Princess of Ayr** 22190, bay mare, foaled in 1907, bred by J. Makeague, Golborne Park, Newton-le-Willows; s. Mathias 6473, d. Luvima 17531 by Rosador 4964
 704 III. (£5).—HENRY WATSON, Newton Kyme, Tadcaster, for **Miss Lofty** 20870, chestnut mare, foaled in 1907, bred by Thomas Watson, Ellerton, York; s. Lord Lofty 9794, d. Veleta 18718 by Sensationalist 5399.
 685 IV. (£5).—MISS A. SYLVIA BROCKLEBANK, Alexton Hall, Uppingham, for **Optimistic**, grey gelding, foaled in 1905.
 705 R. N. & H. C.—MRS. C. E. WAY, Bradpole, Chester, for **Huntington Topsy**.

Class 81.—*Harness Mares or Geldings, not exceeding 14 hands.* [10 entries.]

- 709 I. (£15).—W. FOSTER, Mel-Valley, Moseley, Worcs., for **Mel-Valley's Flame** 10673, bay gelding, foaled in 1906, bred by Walter Cliff, Melbourne Hall, York; s. Royal Success 8995, d. Wortley Bell 14873 by Sir Horace 5402.
 534 II. (£10).—W. FOSTER, for **Mel-Valley's Fame**. (See Class 61.)
 656 III. (£5).—FREDERICK HARDWICK, for **Lady Hardwick**. (See Class 78.)
 655 IV. (£5).—ENOCH GLEN, for **Glenavon Firebrand**. (See Class 78.)
 708 R. N. & H. C.—J. W. ATTER, Little Wonder Stud, Morton, Gainsborough, for **Cæsar's Little Wonder**.

Class 82.—*Harness Mares or Geldings, over 14 and not exceeding 15 hands.* [21 entries.]

- 718 I. (£15).—PHILIP SMITH, Haddon House, Ashton-on-Mersey, for **Queen of Ayr** 20178, bay mare, foaled in 1903, bred by Mrs. Walker, Limefield, West Calder, N.B.; s. Mathias 6473, d. Dearest 2nd 10827 by Lord Rickell 5288.
 715 II. (£10).—W. FOSTER, Mel-Valley, Moseley, Worcs., for **Mel-Valley's King George**, brown gelding, foaled in 1906, bred by J. Miller, Hesse Road, Hull; s. Matchless King 8236, d. Lady Christina 17465 by Forest King 5621.
 717 III. (£5).—PHILIP SMITH, for **Melbourne Princess** 19347, bay mare, foaled in 1906, bred by Walter Cliff, Melbourne Hall, York; s. Merry Wildfire 9342, d. Melbourne Duchess 14571 by Garton Duke of Connaught 3009.
 675 IV. (£5).—THE EXORS. OF FRANK RILEY-SMITH, for **Barton Mystery**. (See Class 79.)
 714 R. N. & H. C.—J. SUMNER DRAPER, Milton, Mass., U.S.A., for **Satire**.

Class 83.—*Harness Mares or Geldings, over 15 and not exceeding 15.2 hands.* [17 entries.]

- 723 I. (£15, & R. N. for Champion.²)—MRS. A. T. GORDON, Freefield, Insch, for **King of the Air**, brown gelding, foaled in 1907, bred by Dr. McGill, Hollinbrook; s. Mathias 6473, d. by Norbury Lightning.
 690 II. (£10).—M. A. MARTINEZ DE HOZ, for **Gay Boy**. (See Class 80).
 727 III. (£5).—PHILIP SMITH, Haddon House, Ashton-on-Mersey, for **Haddon Marphil**, chestnut gelding, foaled in 1904, bred by J. J. Kempley, Market Weighton; s. Polonius 4931, d. Lady Whinmoor 18350 by Edemynag 5989.

¹ Gold Challenge Cup, given by gentlemen interested in Harness Horses, for the best Animal in the Novice Classes 78-80.

² Gold Challenge Cup, given by gentlemen interested in Harness Horses, for the best Animal in Classes 81-84.

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[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

725 **IV. (£5.)**—MISS ELLA S. ROSS, Beechfield, Sale, Cheshire, for **Grand Vulcan**, black gelding, foaled in 1902, bred by R. C. Marshall, Burntshields, Kilbarchan; s. Mathias 6473, d. Rosetta 8426 by Lord Derby 2nd 417.

722 **R. N. & H. C.**—J. SUMNER DRAPER, Milton, Mass., U.S.A., for **Rillington Nimble**.

Class 84.—Harness Mares or Geldings, over 15.2 hands.

[12 entries.]

728 **I. (£15, Champion,¹ & Medal.²)**—H. LE MARCHANT, Elmwood, East Croydon, for **Gaythorn**, chestnut gelding, foaled in 1905, bred by James Prentice, Uddingston, N.B.; s. Mathias 6743, d. Sweetlips by Star of the East.

732 **II. (£10.)**—T. W. SIMPSON, Greenfield House, Laleham-on-Thames, for **Argo** 10564, chestnut gelding, foaled in 1907, bred by W. Burdett Coutts, M.P., Brookfield Stud, Highgate; s. Polonius 4931, d. Fragility 10940 by Agility 2799.

731 **III. (£5.)**—MISS DORA SCHINTZ, Childwall Hall, Liverpool, for **Morocco**, chestnut gelding, foaled in 1900, bred by G. N. Stephenson, Goodmanham, Market Weighton; s. Revival 7263, d. Mayflower 765 by Lord Derby 2nd 417.

704 **IV. (£5.)**—HENRY WATSON, for **Miss Lofty**. (See Class 80.)

730 **R. N. & H. C.**—MISS DORA SCHINTZ, for **Catalina**.

Class 85.—Pairs of Mares or Geldings, not exceeding 15 hands, to be driven in Double Harness. [7 entries.]

717 & 718 **I. (£15, & Champion.³)**—PHILIP SMITH, for **Melbourne Princess** (see Class 82) and **Queen of Ayr** (see Class 82).

534 & 709 **II. (£10.)**—W. FOSTER, for **Mel-Valley's Fame** (see Class 61); and **Mel-Valley's Flame** (see Class 81).

716 & 676 **III. (£5.)**—MISS ELLA S. ROSS, for **Grand Valleru**, black gelding, foaled in 1906, bred by W. J. Tatem, The Court, St. Fagans; s. Ruby 1342, d. Mel-Valley's Princess 12923 by Recruit 1884; and **Grand Vim** (see Class 79).

961 & 714 **IV. (£5.)**—J. SUMNER DRAPER, Milton, Mass., U.S.A., for **Baronet**, brown gelding, foaled in 1906, bred by John Makeague, Golborne Park, Newton-le-Willows; s. Mathias 6473, d. Flame 7867 by Goldfinder 6th 1791; and **Satire** 19494, brown mare, foaled in 1906, bred by John Makeague; s. Mathias 6473, d. Juliet 10065 by Candidate 920.

660 & 708 **R. N. & H. C.**—J. W. ATTER, for **Morton Sensation** and **Cæsar's Little Wonder**.

Class 86.—Pairs of Mares or Geldings, exceeding 15 hands, to be driven in Double Harness. [12 entries.]

740 & 729 **I. (£15, & R. N. for Champion.³)**—MISS ELLA S. ROSS, Beechfield, Sale, Cheshire, for **Grand Vizier**, black gelding, foaled in 1902, bred by Henry Whittick, Newland, Hull; s. Gentleman John 3624, d. Fairy Queen 6643 by Curfew 1755; and **Grand Viscount**, black, foaled in 1906, bred by Gavin Ross, Dykehead, Chapelton; s. Mathias 6473, d. Maid of Honour 1245 by Confidence 163.

701 & 727 **II. (£10.)**—PHILIP SMITH, for **Haddon Proctor**, chestnut gelding, foaled in 1906, bred by Sir Gilbert Greenall, Bart., Walton Hall, Warrington; s. Copper King 7764, d. Terrington Psaltery 13978 by Goldfinder 6th 1791; and **Haddon Marphil**. (See Class 83.)

684 & 685 **III. (£5.)**—MISS A. SYLVIA BROCKLEBANK, for **Illumination**, bay gelding, foaled in 1906, bred by the Rt. Hon. F. Wrench, Killasnoona, Ballybraek, co. Dublin; s. Blaze 2nd 2376 d. Bay Clara 14120 by Chocolate Junior 4185; and **Optimistic**. (See Class 80.)

730 & 741 **IV. (£5.)**—MISS DORA SCHINTZ, Childwall Hall, Liverpool, for **Catalina** 17320, chestnut mare, foaled in 1902, bred by W. Burdett Coutts, M.P., Brookfield Stud, London; s. Polonius 4931, d. Cuckoo Bright 10803 by Last Fashion 4343; and **Woodhatch Ruth**, chestnut mare, foaled in 1907, bred by R. P. Evans, Woodhatch House, Reigate; s. Evanthis 3463, d. Terrington Ruth 16988 by Lord DREWTON 2nd 6817.

732 & 699 **R. N. & H. C.**—T. W. SIMPSON, Laleham, for **Argo** and **Coronet**.

Class 87.—Pairs of Mares or Geldings, not exceeding 15 hands, to be driven Tandem. [6 entries.]

718 & 717 **I. (£15.)**—PHILIP SMITH, for **Queen of Ayr** (see Class 82); and **Melbourne Princess** (see Class 82).

664 & 714 **II. (£10.)**—J. SUMNER DRAPER, for **Baronet** (see Class 85); and **Satire** (see Class 85).

716 & 676 **III. (£5.)**—MISS ELLA S. ROSS, for **Grand Valleru** (see Class 85); and **Grand Vim** (see Class 79)

¹ Gold Challenge Cup, given by gentlemen interested in Harness Horses, for the best Animal in Classes 81-84.

² Gold Medal, given by the Hackney Horse Society for the best Mare or Gelding in Classes 78-84, the produce of a registered Hackney Stallion.

³ The "Viking" Gold Challenge Cup, given by a Member of the R.A.S.E. for the best pair in Classes 85 and 86.

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[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

- 660 & 708 IV. (£5.)—J. W. ATTER, Little Wonder Stud, Morton, Gainsborough, for **Morton Sensation** 20885, chestnut mare, foaled in 1906; s. Julius Cæsar 2nd 5666, d. Little Wonder 12877 by Don Juan 3rd 6725; and **Cæsar's Little Wonder** 18972, chestnut mare, foaled in 1905; s. Julius Cæsar 2nd 5666, d. Little Wonder 12077 by Don Juan 3rd 6725.

Class 88.—*Pairs of Mares or Geldings, over 15 hands, to be driven Tandem.* [8 entries.]

- 732 & 699 I. (£15, & **Champion**.¹)—T. W. SIMPSON, for **Argo** (see Class 84); and **Coronet** 10091, chestnut gelding, foaled in 1906, bred by Henry Moore, Burn Butts, Cranswick, Hull; s. Garton Duke of Connaught 3009, d. Burn Butts Snowdrift 12435 by Field Marshal 2986.
684 & 685 II. (£10, & R. N. for **Champion**.¹)—MISS A. SYLVIA BROCKLEBANK, for **Illumination** (see Class 86); and **Optimistic** (see Class 80).
730 & 741 III. (£5.)—MISS DORA SCHINTZ, for **Catalina** (see Class 86); and **Woodhatch Ruth** (see Class 86).
740 & 725 IV. (£5.)—MISS ELLA S. ROSS, for **Grand Vizier** (see Class 80); and **Grand Vulcan** (see Class 83).

Four-in-hand Teams.

Class 89.—*Mares or Geldings.* [4 entries.]

- C I. (£20, & **Champion**.²)—MISS ELLA S. ROSS, Beechfield, Sale, Cheshire.
A II. (£15.)—MISS A. SYLVIA BROCKLEBANK, Alexton Hall, Uppingham.
D III. (£10.)—STEADMAN & SONS, Boro' Garage, Doncaster.

Pit Ponies.³

Class 90.—*Two Pit Ponies, not exceeding 13 hands.* [16 entries.]

- 750 I. (£10.)—THE HICKLETON MAIN COLLIERY CO., LTD., Thurnscoe, near Rotherham, for **Tyke**, red roan gelding, foaled in 1902; and **Imp**, dark chestnut gelding, foaled in 1902.
753 II. (£5.)—F. K. ROBINSON, Tackley Colliery, South Elmsall, for **Don**, cream gelding, foaled about 1906; and **Short**, cream gelding, foaled about 1905.
745 III. (£3, & R. N. for **Special**.⁴)—THE ACKTON HALL COLLIERY CO., Featherstone, near Pontefract, for **Dick**, bay, foaled in 1905; and **Dobbin**, chestnut gelding, foaled in 1894.
746 R. N. & H. C., & R. N. for **Special**.⁴)—THE ACKTON HALL COLLIERY CO., for **Dobbin** and **Robin**.

Class 91.—*Two Pit Ponies, over 13 and not exceeding 14 hands.* [13 entries.]

- 761 I. (£10, & **Special**.⁴)—BARBER, WALKER & CO., Scawthorpe, Doncaster, for **Count**, roan gelding, foaled in 1906; and **Duke**, roan gelding, foaled in 1905.
760 II. (£5, & R. N. for **Special**.⁴)—THE ACKTON HALL COLLIERY CO., Featherstone, near Pontefract, for **Cronje**, chestnut gelding, foaled in 1904; and **Spot**, bay gelding, foaled in 1900.
762 III. (£3, & **Special**.⁴)—BARBER, WALKER & CO., for **Sultan**, brown gelding, foaled in 1906; and **Emperor**, bay gelding, foaled in 1906.
763 R. N. & H. C.—BRODSWORTH MAIN COLLIERY CO., LTD., Doncaster, for **Gas** and **Chick**.

JUMPING COMPETITIONS.³

Class A.—*Mares or Geldings.* [23 entries.]

- 5 I. (£25.)—E. U. JOHNSON, Moscow Farm, Little Dalby, Melton Mowbray, for **Darkie**.
8 II. (£10.)—J. H. DUNN, Coombe Cottage, Kingston Hill, for **Sailor**.
11 III. (£5.)—J. & T. GLENCROSS, Garth Stables, Weston-super-Mare, for **Nomination**.
10 IV. (£5.)—F. VOLLER GRANGE, Alvaston, Nantwich, for **Rufus**.
3 V. (£5.)—HARRY BEEBY, Manor House Stables, Melton Mowbray, for **Mr. Porter**.

¹ The "Venture" Gold Challenge Cup, given by a Member of the R.A.S.E. for the best Tandem in Classes 87 and 88.

² Gold Challenge Cup, given by a Member of the R.A.S.E. interested in Coaching, for the best team in Class 89.

³ Prizes given by the Doncaster Local Committee.

⁴ Special Prize of £5 given for the best four Ponies in Classes 90 and 91, the property of one Exhibitor.

lxviii *Award of Poultry Prizes at Doncaster, 1912.*

[Unless otherwise stated, each prize animal named below was "bred by exhibitor."]

Class B.—*Mares or Geldings.* [18 entries.]

- 10 I. (£20.)—J. & T. GLENCROSS, Garth Stables, Weston-super-Mare, for **Nomination**.
- 5 II. (£10.)—E. G. EASTERBY, Mount Pleasant, Eserick, York, for **Buller**.
- 2 III. (£5.)—THOMAS & HENRY WARD, Pinchinthorpe, Great Ayton, for **Fisherman**.
- 6 IV. (£5.)—JAMES & THOMAS GLENCROSS, for **Kitty**.
- 11 V. (£5.)—J. H. DUNN, Coombe Cottage, Kingston Hill, for **Comet**.

Class C.—*Mares or Geldings.* [13 entries.]

- 6 I. (£15.)—F. W. FOSTER, Marsh Farm, Etwall, Derby, for **Paddy**.
- 3 } **Equal Prize** { WELLBURN BROTHERS, Fryston, Ferrybridge, for **Topper**.
- 5 } of £5. { F. VOLLER GRANGE, Alvaston, Nantwich, for **Rufus**.
- 9 IV. (£5.)—J. H. DUNN, Coombe Cottage, Kingston Hill, for **Comet**.
- 10 V. (£5.)—T. & H. WARD, Pinchinthorpe, Great Ayton, for **Fisherman**.

Class D.—*Champion Class. Mares or Geldings.* [12 entries.]

- 7 I. (£25.)—J. H. DUNN, Coombe Cottage, Kingston Hill, for **Comet**.
- 2 II. (£15.)—T. E. WHITTINGHAM, Byrkley Street, Burton-on-Trent, for **Ormond Boy**.
- 6 III. (£10.)—J. & T. GLENCROSS, Garth Stables, Weston-super-Mare, for **Kitty**.
- 8 IV. (£5.)—F. W. FOSTER, Marsh Farm, Etwall, Derby, for **Paddy**.
- 9 V. (£5.)—JAMES & THOMAS GLENCROSS, for **Nomination**.

POULTRY.

By "Cock," "Hen," "Drake," "Duck," "Gander," and "Goose," are meant birds hatched previous to January 1, 1912; and by "Cockerel," "Pullet," "Young Drake," and "Duckling," are meant birds hatched in 1912, previous to June 1.

Class 349.—*Old English Game Spangled Cocks.* [5 entries, 1 absent.]

- 2 I. (30s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 8 II. (20s.)—F. NORTON, Sowdell Terrace, Ossett.
- 3 III. (10s.)—WALTER MYERS, Ossett, Yorks.
- 1 R. N. & H. C.—W. & J. H. HEYS, Mount Henley, Rochdale.

Class 350.—*Old English Game Spangled Hens.* [4 entries.]

- 9 I. (30s.)—JOHN OLIVER, Threepwood Farm, Haydon Bridge, Northumberland.
- 8 II. (20s.)—F. NORTON, Sowdell Terrace, Ossett.
- 6 III. (10s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 7 R. N. & H. C.—WALTER MYERS, Ossett, Yorks.

Class 351.—*Old English Game Black-Red Cocks.* [8 entries, none absent.]

- 16 I. (30s.), & 13 III. (10s.)—T. C. HEATH, Keele, Newcastle, Staffs.
- 14 II. (20s.)—W. & J. H. HEYS, Mount Henley, Rochdale.
- 11 R. N. & H. C.—R. W. L. FERNANDES, The Red House, Redbourn, Herts.

Class 352.—*Old English Game Clay or Wheaten Hens.*

[8 entries, none absent.]

- 18 I. (30s.), & 22 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.
- 21 II. (20s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 19 III. (10s.)—W. & J. H. HEYS, Mount Henley, Rochdale.

Class 353.—*Old English Game Cocks, any other colour*

[8 entries, none absent.]

- 27 I. (30s.)—R. W. L. FERNANDES, The Red House, Redbourn, Herts.
- 29 II. (20s.)—W. & J. H. HEYS, Mount Henley, Rochdale.
- 30 III. (10s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 28 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.

Class 354.—*Old English Game Hens, any other colour.*

[7 entries, none absent.]

- 37 I. (30s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 40 II. (20s.), & 36 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.
- 34 III. (10s.)—THOMAS BLAIR, The Grange, Hayton, Bullgill, Cumberland.

Class 355.—*Old English Game Cockerels, any colour.* [4 entries.]

- 41 I. (30s.)—W. J. FAIRCLOUGH, Kennels, Waddington, Clitheroe.
- 43 II. (20s.)—T. C. HEATH, Keele, Newcastle, Staffs.
- 42 III. (10s.)—C. HARKER, Blennerhasset, Carlisle.
- 44 R. N. & H. C.—R. S. MARSDEN, Rimington, Clitheroe.

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Class 356.—Old English Game Pullets, any colour. [6 entries, none absent.]

- 47 I. (30s.)—C. HARKER, Blennerhasset, Carlisle.
- 45 II. (20s.)—W. J. FAIRCLOUGH, Kennels, Waddington, Clitheroe.
- 49 III. (10s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 48 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.

Class 357.—Indian Game Cocks or Cockerels. [10 entries, 1 absent.]

- 54 I. (30s.)—GEORGE CROFT, Gayton-le-Marsh, Alford.
- 56 II. (20s.)—W. & J. H. HEYS, Mount Henley, Rochdale.
- 51 III. (10s.)—J. BRENNAND, Baldersby Park, Thirsk.
- 53 R. N. & H. C.—W. H. CRANE, Roseholme, Hollyfield Road, Sutton Coldfield.

Class 358.—Indian Game Hens or Pullets. [10 entries, 1 absent.]

- 65 I. (30s.)—W. & J. H. HEYS, Mount Henley, Rochdale.
- 63 II. (20s.)—S. E. PHILLIPS, Glam. Golf Club, Lower Penarth, S. Wales.
- 61 III. (10s.)—B. BOWLES, Carleton, Forehoe, Wymondham.
- 63 R. N. & H. C.—F. W. GENTLE, Avenue Poultry Farm, Brandon.

Class 359.—Modern Game Cocks or Cockerels, any colour.
[8 entries, none absent.]

- 73 I. (30s.)—W. B. FOWLER, Great Gransden, Sandy.
- 77 II. (20s.)—TOM TAYLOR, Darley Bank, Worsbro' Dale, Barnsley.
- 74 III. (10s.)—F. NORTON, Sowdell Terrace, Ossett.
- 72 R. N. & H. C.—J. BRENNAND, Baldersby Park, Thirsk.

Class 360.—Modern Game Hens or Pullets, any colour.
[7 entries, 1 absent.]

- 85 I. (30s.)—TOM TAYLOR, Darley Bank, Worsbro' Dale, Barnsley.
- 81 II. (20s.)—W. B. FOWLER, Great Gransden, Sandy.
- 82 III. (10s.)—F. NORTON, Sowdell Terrace, Ossett.
- 80 R. N. & H. C.—J. BRENNAND, Baldersby Park, Thirsk.

Class 361.—Black Sumatra Game Cocks or Cockerels.
[9 entries, 1 absent.]

- 90 I. (30s.)—W. HUMPHREY, Black Park, Horsford, Norwich.
- 91 II. (20s.)—F. R. EATON, Cleveland House, Eaton, Norwich.
- 87 III. (10s.)—JOHN HARRISON, 19 Park View, Cefn Road, Blackwood, Mon.
- 92 R. N. & H. C.—J. W. HERBERT, Trevidna, Silchester, Reading.

Class 362.—Black Sumatra Game Hens or Pullets.
[8 entries, 1 absent.]

- 99 I. (30s.)—W. HUMPHREY, Black Park, Horsford, Norwich.
- 97 II. (20s.)—MRS. F. HERBERT, Ty-Gwgan, Raglan, Mon.
- 95 III. (10s.)—DAVID B. CHESTERFIELD, Rock House, Glynneath, Glam.
- 100 R. N. & H. C.—F. R. EATON, Cleveland House, Eaton, Norwich.

Class 363.—Langshan Cocks or Cockerels. [12 entries, 1 absent.]

- 106 I. (30s.)—R. S. MARSDEN, Rimington, Clitheroe.
- 108 II. (20s.), & 103 III. (10s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
- 113 R. N. & H. C.—HARRY WALLIS, Warley, Brentwood.

Class 364.—Langshan Hens or Pullets. [14 entries, 2 absent.]

- 114 I. (30s.), & 118 II. (20s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
- 124 III. (10s.)—HARRY WALLIS, Warley, Brentwood.
- 119 R. N. & H. C.—R. S. MARSDEN, Rimington, Clitheroe.

Class 365.—Plymouth Rock Barred Cocks. [11 entries, 1 absent.]

- 136 I. (30s.)—WALTER WRIGHT, Burton, Westmoreland.
- 137 II. (20s.)—MRS. E. J. WROUGHTON, Hutton Bonville, Northallerton.
- 127 III. (10s.)—C. N. ALEXANDER, Stockwell House, Knaresborough.
- 129 R. N. & H. C.—J. BRENNAND, Baldersby Park, Thirsk.

Class 366.—Plymouth Rock Barred Hens. [12 entries, 1 absent.]

- 144 I. (30s.)—R. MAKINSON, The Square, Burton, Carnforth.
- 142 II. (20s.), & 146 R. N. & H. C.—J. MARSDEN CHANDLER, Fairfield, Brampton.
- 148 III. (10s.)—E. MARSHALL, Lenton, Nottingham.

Class 367.—Plymouth Rock Barred Cockerels. [9 entries, 2 absent.]

- 154 I. (30s.)—T. W. GIBSON, Market House, Kirkby Lonsdale.
- 157 II. (20s.)—NEIL PAUL, Model Poultry Farm, Beith.
- 158 III. (10s.)—J. S. WALKER, Hardriggs, Crosthwaite, Kendal.
- 152 R. N. & H. C.—J. MARSDEN CHANDLER, Fairfield, Brampton.

Class 368.—*Plymouth Rock Barred Pullets.* [13 entries, 2 absent.]

- 159 I. (30s.)—JAMES W. AIREY, 5, Dalton Square, Lancaster.
 167 I. (20s.)—T. W. GIBSON, Market House, Kirkby Lonsdale.
 169 III. (10s.)—JOHN PENNINGTON, Heswall-in-Dee, *via* Chester.
 170 R. N. & H. C.—J. S. WALKER, Hardriggs, Crosthwaite, Kendal.

Class 369.—*Plymouth Rock Cocks, any other colour.* [12 entries, 1 absent.]

- 176 I. (30s.)—NEIL PAUL, Model Poultry Farm, Beith.
 180 II. (20s.), 183 III. (10s.), & 182 R. N. & H. C.—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 370.—*Plymouth Rock Hens, any other colour* [6 entries, none absent.]

- 188 I. (30s.), & 187 R. N. & H. C.—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 186 II. (20s.)—HERBERT SPENSLEY, Oaks Farm, Menston, *via* Leeds.
 184 III. (10s.)—BOLTON MODEL POULTRY FARM, Westhoughton, Lancs.

Class 371.—*Plymouth Rock Cockerels, any other colour.* [12 entries, 1 absent.]

- 194 I. (30s.)—L. H. NUTTER, Burton, *via* Carnforth.
 200 II. (20s.), & 201 III. (10s.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 196 R. N. & H. C.—ROBERT H. SLATER, Loud Bridge, Chipping, Longridge, Preston.

Class 372.—*Plymouth Rock Pullets, any other colour.* [19 entries, 3 absent.]

- 207 I. (30s.)—J. E. HARPER, Brooklands, Weybridge.
 211 II. (20s.)—J. E. D. MOYSEY, Venton, Totnes.
 213 III. (10s.)—NEIL PAUL, Model Poultry Farm, Beith.
 202 R. N. & H. C.—JAMES BATEMAN, Milnthorpe.

Class 373.—*Gold or Silver Laced Wyandotte Cocks.* [3 entries.]

- 222 I. (30s.), & 223 II. (20s.)—W. SMITH LAMBERT, Drabble House Farm, Silsden.
 221 III. (10s.)—TOM H. FURNESS, Carlton House, Chesterfield.

Class 374.—*Gold or Silver Laced Wyandotte Hens.* [5 entries, 1 absent.]

- 228 I. (30s.), & 226 II. (20s.)—W. SMITH LAMBERT, Drabble House Farm, Silsden.
 225 III. (10s.)—TOM H. FURNESS, Carlton House, Chesterfield.
 227 R. N. & H. C.—HERBERT SPENSLEY, Oaks Farm, Menston, *via* Leeds.

Class 375.—*Gold or Silver Laced Wyandotte Cockerels.*

[4 entries, 2 absent.]

- 230 I. (30s.), & 232 II. (20s.)—W. SMITH LAMBERT, Drabble House Farm, Silsden.

Class 376.—*Gold or Silver Laced Wyandotte Pullets.* [6 entries, 1 absent.]

- 233 I. (30s.)—W. SMITH LAMBERT, Drabble House Farm, Silsden, Keighley.
 235 II. (20s.)—LT.-COL. F. D. ROBINSON, Clitheroe Castle, Clitheroe.
 234 III. (10s.), & 237 R. N. & H. C.—J. M. PHILIPSON, Wyandotte Farm, Haydon Bridge.

Class 368.—*White Wyandotte Cocks.* [8 entries, 2 absent.]

- 241 I. (30s.)—E. R. CRIPPEN, Merrilocks Poultry Farm, Blundellsands, Liverpool
 242 II. (20s.)—TOM H. FURNESS, Carlton House, Chesterfield.
 239 III. (10s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
 243 R. N. & H. C.—MRS. GOODCHILD, Hepworth Hall, Halstead.

Class 378.—*White Wyandotte Hens.* [11 entries, 3 absent.]

- 252 I. (30s.), & 248 R. N. & H. C.—E. R. CRIPPEN, Merrilocks Poultry Farm, Blundellsands, Liverpool.
 247 II. (20s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
 255 III. (10s.)—MRS. E. A. LYCETT GREEN, Darrington Hall, Pontefract.

Class 379.—*White Wyandotte Cockerels.* [25 entries, 2 absent.]

- 282 I. (30s.)—JOHN TOWNEND & SON, Lodge Poultry Farm, Pontefract.
 263 II. (20s.)—G. H. DALRYMPLE, Wynhol, Clevedon, Somerset.
 266 III. (10s.)—TOM H. FURNESS, Carlton House, Chesterfield.
 267 R. N. & H. C.—MRS. GOODCHILD, Hepworth Hall, Halstead.

Class 380.—*White Wyandotte Pullets.* [32 entries, 6 absent.]

- 292 I. (30s.)—TOM H. FURNESS, Carlton House, Chesterfield.
 293 II. (20s.)—MRS. GOODCHILD, Hepworth Hall, Halstead.
 310 III. (10s.)—JOHN TOWNEND & SON, Lodge Poultry Farm, Pontefract.
 303 R. N. & H. C.—H. T. MUSGRAVE, Moorlands, Burley-in-Wharfedale.

Class 381.—*Black Wyandotte Cocks.* [11 entries, 1 absent.]

- 322 I. (30s.)—T. C. HEATH, Keele, Newcastle, Staffs.
 318 II. (20s.)—W. W. DUGDALE, Waddington, Yorks.
 317 III. (10s.)—ALBERT CHELL, Poultry Farm, Biddulph, Congleton.
 320 R. N. & H. C.—TOM H. FURNESS, Carlton House, Chesterfield.

Class 382.—Black Wyandotte Hens. [11 entries, 2 absent.]

- 326 I. (30s.)—BOLTON MODEL POULTRY FARM, Westhoughton, Lanes.
 335 II. (20s.)—GEORGE WOOD, Westfield, Greetland, Halifax.
 328 III. (10s.)—T. W. GIBSON, Market House, Kirkby Lonsdale.
 329 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.

Class 383.—Black Wyandotte Cockerels. [6 entries, 2 absent.]

- 337 I. (30s.)—ALFRED BIRCH, Edge Farm, Sefton, Liverpool.
 339 II. (20s.)—DR. WALTER E. COOPER, East Harling, Norfolk.
 342 III. (10s.)—S. C. ROBERTSHAW, Backsbottom Farm, Wray, Lancaster.
 340 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.

Class 384.—Black Wyandotte Pullets. [10 entries, 2 absent.]

- 352 I. (30s.)—GEORGE WOOD, Westfield, Greetland, Halifax.
 345 II. (20s.)—FAWCETT BROTHERS, Ireby Hall, Kirkby Lonsdale.
 347 III. (10s.), & 343 R. N. & H. C.—ALFRED BIRCH, Edge Farm, Sefton, Liverpool.

Class 385.—Partridge Wyandotte Cocks or Cockerels.

[6 entries, none absent.]

- 356 I. (30s.), 358 II. (20s.), & 357 III. (10s.)—RICHARD WATSON, Thorngarth, Thackley, Bradford.
 353 R. N. & H. C.—J. R. ALLEN, Giles Lane, St. Thomas Hill, Canterbury.

Class 386.—Partridge Wyandotte Hens or Pullets. [6 entries, none absent.]

- 360 I. (30s.)—HUGH GUNN, Castle Villa Poultry Farm, Gloucester.
 359 II. (20s.)—WALTER FOULDS, Clydesdale, Kirby Muxloe, Leicester.
 363 III. (10s.)—RICHARD WATSON, Thorngarth, Thackley, Bradford.

Class 387.—Columbian Wyandotte Cocks or Cockerels. [12 entries, 3 absent.]

- 368 I. (30s.)—WILLIAM HODGES, Oatlands Farm, Weybridge.
 373 II. (20s.)—R. S. THORP, Daisymere, Buxton.
 370 III. (10s.)—JOHN T. KITCHEN, Forest View Poultry Farm, Barrow-on-Soar.
 371 R. N. & H. C.—JAMES T. HINCKS, The Charn, Sileby, Loughborough.

Class 388.—Columbian Wyandotte Hens or Pullets. [14 entries, 3 absent.]

- 384 I. (30s.) & 391 II. (20s.)—WILLIAM HODGES, Oatlands Farm, Weybridge.
 382 II. (20s.), & 378 III. (10s.)—JAMES T. HINCKS, The Charn, Sileby, Loughborough.
 385 R. N. & H. C.—F. ONSLOW PIERCY, The Limes, Burston, Diss.

Class 389.—Spangled Wyandotte Cocks or Cockerels. [3 entries.]

- 393 I. (30s.), & 391 II. (20s.)—W. L. ARCHER, Ashwell's Farm, Chalfont St. Giles.
 392 III. (10s.)—MISS A. N. HARLAND, Chalfont St. Giles.

Class 390.—Spangled Wyandotte Hens or Pullets. [2 entries.]

- 394 I. (30s.)—W. L. ARCHER, Ashwell's Farm, Chalfont St. Giles.
 395 II. (20s.)—MISS A. N. HARLAND, Chalfont St. Giles.

Class 391.—Blue Wyandotte Cocks or Cockerels. [7 entries, none absent.]

- 400 I. (30s.)—MRS. W. HOLDSWORTH, Fordhouses, Wolverhampton.
 399 II. (20s.)—TOM H. FURNESS, Carlton House, Chesterfield.
 396 III. (10s.)—JAMES BATEMAN, Milnthorpe.
 401 R. N. & H. C.—MATTHEW SLATER, Greenlot, Caton, Lancaster.

Class 392.—Blue Wyandotte Hens or Pullets. [7 entries, 1 absent.]

- 408 I. (30s.)—J. M. BLACKWOOD, Cranhill Poultry Farm, Street.
 406 II. (20s.)—TOM H. FURNESS, Carlton House, Chesterfield.
 404 III. (10s.)—BOLTON MODEL POULTRY FARM, Westhoughton, Lanes.
 409 R. N. & H. C.—JAMES WALLBANK, Belmont, Longridge, Preston.

Class 393.—Wyandotte Cocks or Cockerels, any other variety.

[10 entries, 2 absent.]

- 418 I. (30s.)—RICHARD WATSON, Thorn Garth, Thackley, Bradford.
 410 II. (20s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
 413 III. (10s.)—M. HARRISON, Shaw House, Edmund Castle, Carlisle.
 415 R. N. & H. C.—JAMES MELLOR, Wormhill Meadows, Buxton.

Class 394.—Wyandotte Hens or Pullets, any other variety.

[6 entries, none absent.]

- 421 I. (30s.)—T. CHARLTON, Kepler Poultry Farm, Crawcrook, Ryton-on-Tyne.
 422 II. (20s.)—HUGH GUNN, Castle Villa Poultry Farm, Gloucester.
 424 III. (10s.)—RICHARD WATSON, Thorn Garth, Thackley, Bradford.
 425 R. N. & H. C.—J. Y. WHEATLEY, Prospect House, Appleton Roebuck, Bolton Percy.

Class 395.—*Buff Orpington Cocks.* [19 entries, none absent.]

- 430 I. (30s.)—FRANK BLOOMER, Foxcote, Stourbridge.
 436 II. (20s.)—P. B. GOVETT, Tideford, St. Germans.
 432 III. (10s.)—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 426 R. N. & H. C.—R. ANTHONY, Home Farm, Euxton, Chorley,

Class 396.—*Buff Orpington Hens.* [6 entries, 1 absent.]

- 445 I. (30s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
 450 II. (20s.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 447 III. (10s.)—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 448 R. N. & H. C.—MISS LE PATOUREL, Edenstead, Crosby-on-Eden.

Class 397.—*Buff Orpington Cockerels.* [24 entries, 7 absent.]

- 466 I. (30s., & R. N. for Champion.)—MISS LE PATOUREL, Edenstead, Crosby-on-Eden.
 457 II. (20s.)—J. W. P. CUSSONS, Buff Orpington Poultry Farm, St. Kilvington, Thirsk.
 461 III. (10s.)—W. J. GOLDING, Westwood Farm, Weald, Kent.
 464 R. N. & H. C.—CHARLES KEETLEY, Easthorpe Cottage, Lowdham.

Class 398.—*Buff Orpington Pullets.* [26 entries, 7 absent.]

- 479 I. (30s., & Champion.)—MISS S. CAREY, Drabble House Farm, Silsden, Keighley.
 488 II. (20s.), & 492 III. (10s.)—W. J. GOLDING, Westwood Farm, Weald.
 483 R. N. & H. C.—J. W. P. CUSSONS, South Kilvington, Thirsk.

Class 399.—*White Orpington Cocks.* [14 entries, 3 absent.]

- 506 I. (30s.), & 511 II. (20s.)—MURRAY LINDNER, Ham Court Poultry Farm, Charlton Kings, Cheltenham.
 503 III. (10s.)—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 502 R. N. & H. C.—MISS S. CAREY, Drabble House Farm, Silsden, Keighley.

Class 400.—*White Orpington Hens.* [19 entries, 2 absent.]

- 528 I. (30s.)—ALAN T. STOREY, Brock House Poultry Farm, Freshfield, Liverpool.
 521 II. (20s.), & 517 R. N. & H. C.—MISS S. CAREY, Drabble House Farm, Silsden.
 529 III. (10s.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 401.—*White Orpington Cockerels.* [31 entries, 8 absent.]

- 559 I. (30s.)—WHITAKER & TOOTILL, Quarry Farm, Pool, Leeds.
 542 II. (20s.)—MISS CHEETHAM, The Hawthorns, Brighouse.
 546 III. (10s.)—J. E. HARPER, Brooklands, Weybridge.
 544 R. N. & H. C.—W. J. GOLDING, Westwood Farm, Weald.

Class 402.—*White Orpington Pullets.* [34 entries, 4 absent.]

- 573 I. (30s.)—MISS CHEETHAM, The Hawthorns, Brighouse.
 569 II. (20s.)—MISS S. CAREY, Drabble House Farm, Silsden, Keighley.
 598 III. (10s.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 577 R. N. & H. C.—R. GWYNNE-FURLEY, Prestbury, Cheltenham.

Class 403.—*Black Orpington Cocks.* [15 entries, none absent.]

- 603 I. (30s.)—W. BURCH, Bleangate Poultry Farm, Herne, Kent.
 612 II. (20s.)—J. E. SHANKS, Stetchworth, Newmarket.
 607 III. (10s.)—TENNYSON FAWKES, Royal Stock Farm, Leonard Stanley, Stonehouse.
 609 R. N. & H. C.—T. C. HEATH, Keele, Newcastle, Staffs.

Class 404.—*Black Orpington Hens.* [16 entries, none absent.]

- 626 I. (30s.)—T. C. HEATH, Keele, Newcastle, Staffs.
 620 II. (20s.)—WILLIAM COOK & SONS, Orpington House, St. Mary Cray.
 625 III. (10s.)—GEORGE E. GUSH, Thackham, Winchfield.
 629 R. N. & H. C.—T. HOYLE, Savile Royd, Halifax.

Class 405.—*Black Orpington Cockerels.* [7 entries, 1 absent.]

- 633 I. (30s.)—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 632 II. (20s.)—WILLIAM COOK & SONS, Orpington House, St. Mary Cray.
 630 III. (10s.)—W. M. BELL, St. Leonard's Poultry Farm, Ringwood.
 634 R. N. & H. C.—A. H. DRYSDALE, Woodknoll, Lindfield, Haywards Heath.

Class 406.—*Black Orpington Pullets.* [10 entries, 1 absent.]

- 645 I. (30s.)—T. J. STABLES, Burton, Westmorland.
 641 II. (20s.)—W. J. GOLDING, Westwood Farm, Weald, Kent.
 638 III. (10s.)—WILLIAM COOK & SONS, Orpington House, St. Mary Cray.
 639 R. N. & H. C.—A. H. DRYSDALE, Woodknoll, Lindfield, Haywards Heath.

¹ A Piece of Plate given by the Buff Orpington Club for the best Buff Orpington in Classes 395 to 398.

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Class 407.—*Spangled Orpington Cocks or Cockerels.* [6 entries, none absent.]

- 647 I. (30s.).—WALTER BUXTON, Trinity Poultry Farm, Bentworth, Alton.
 651 II. (20s.), & 648 III. (10s.).—WILLIAM COOK & SONS, Orpington House, St. Mary Cray.
 650 R. N. & H. C.—MRS. IRENE OSGOOD, Guilsborough Hall, Northampton.

Class 408.—*Spangled Orpington Hens or Pullets.* [5 entries, 1 absent.]

- 656 I. (30s.), & 653 II. (20s.).—WALTER BUXTON, Trinity Poultry Farm, Bentworth, Alton.
 652 III. (10s.).—LAWRENCE BOOTH, Dingle Bank, Chester.
 655 R. N. & H. C.—MRS. IRENE OSGOOD, Guilsborough Hall, Northampton.

Class 409.—*Orpington Cocks or Cockerels, any other colour.*

[9 entries, none absent.]

- 660 I. (30s.).—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 661 II. (20s.).—BROWN & HEATH, Poultry Farm, Staplehurst.
 662 III. (10s.).—CAPT. MAX DE BATHE, Hartley Court, Reading.
 665 R. N. & H. C.—J. RUSSEL, Halstead Place, Sevenoaks.

Class 410.—*Orpington Hens or Pullets, any other colour.*

[8 entries, none absent.]

- 669 I. (30s.).—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 667 II. (20s.).—J. MARSDEN CHANDLER, Fairfield, Brampton, Chesterfield.
 671 III. (10s.), & 668 R. N. & H. C.—WILLIAM COOK & SONS, St. Mary Cray.

Class 411.—*Minorca Cocks or Cockerels.* [7 entries, none absent.]

- 679 I. (30s.), & 677 R. N. & H. C.—A. G. PITTS, Highbridge, Somerset.
 674 II. (20s.).—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.
 680 III. (10s.).—WHITAKER AND TOOTILL, Quarry Farm, Pool, Leeds.

Class 412.—*Minorca Hens or Pullets.* [12 entries, none absent.]

- 688 I. (30s.).—A. G. PITTS, Highbridge, Somerset.
 690 II. (20s.), & 692 III. (10s.).—WHITAKER & TOOTILL, Quarry Farm, Pool, Leeds.
 681 R. N. & H. C.—R. ANTHONY, Home Farm, Euxton, Chorley.

Class 413.—*White Leghorn Cocks or Cockerels.* [5 entries, 1 absent.]

- 693 I. (30s.).—R. ANTHONY, Home Farm, Euxton, Chorley.
 696 II. (20s.), & 697 III. (10s.).—WHITAKER & TOOTILL, Quarry Farm, Pool, Leeds.
 695 R. N. & H. C.—VICTORIA MEMORIAL POULTRY FARM, Beckermeth, Cumberland.

Class 414.—*White Leghorn Hens or Pullets.* [9 entries, none absent.]

- 702 I. (30s.).—ALAN T. STOREY, Brook House Poultry Farm, Freshfield, Liverpool.
 698 II. (20s.).—R. ANTHONY, Home Farm, Euxton, Chorley.
 699 III. (10s.).—DOBSON BROTHERS, 29 Church Street, Kirkham.
 704 R. N. & H. C.—WHITAKER & TOOTILL, Quarry Farm, Pool, Leeds.

Class 415.—*Brown Leghorn Cocks or Cockerels.* [6 entries, none absent.]

- 707 I. (30s.), & 712 II. (20s.).—R. ANTHONY, Home Farm, Euxton, Chorley.
 709 III. (10s.).—ERNEST L. SIMON, Pembroke.
 711 R. N. & H. C.—WHITAKER & TOOTILL, Quarry Farm, Pool, Leeds.

Class 416.—*Brown Leghorn Hens or Pullets.* [8 entries, 1 absent.]

- 713 I. (30s.), & 718 III. (10s.).—R. ANTHONY, Home Farm, Euxton, Chorley.
 714 II. (20s.).—JOSEPH CLIFFE, Magdale, Honley, Huddersfield.
 715 R. N. & H. C.—DENYER & IVE, Walton Road, East Molesey.

Class 417.—*Black Leghorn Cocks or Cockerels.* [6 entries, 1 absent.]

- 721 I. (30s.).—CHARLES BILSBOROUGH, Hepgreave Farm, Barton, Preston.
 723 II. (20s.).—JOSEPH EADSON, Park Villa, Ightenhill, Burnley.
 726 III. (10s.).—HARRY HARTLEY, The Poplars, Cottontice Lane, Colne.
 722 R. N. & H. C.—W. BRADBURY, Cliff Grange, Constable Road, Ipswich.

Class 418.—*Black Leghorn Hens or Pullets.* [10 entries, 2 absent.]

- 731 I. (30s.).—T. C. HEATH, Keele, Newcastle, Staffs.
 735 II. (20s.).—SMITH BROTHERS, 196 Every Street, Nelson.
 727 III. (10s.).—CHARLES BILSBOROUGH, Hepgreave Farm, Barton, Preston.
 736 R. N. & H. C.—SMITH HARRISON, Rings Cottage, Colne.

Class 419.—*Leghorn Cocks or Cockerels, any other colour.*

[8 entries, 1 absent.]

- 738 I. (30s.).—A. R. FISH, Holme Mead, Hutton, Preston.
 739 II. (20s.).—A. J. GILES, Bury, Pulborough.
 742 III. (10s.).—G. NURSE, 22, Wellington Street, Canton, Cardiff.
 744 R. N. & H. C.—MRS. VERREY, The Warren, Oxshott.

Class 420.—*Leghorn Hens or Pullets, any other colour.*

[7 entries, 2 absent.]

- 750 I. (30s.)—G. & R. HENLEY, Grandborough, Winslow.
 745 II. (20s.)—J. BATTERSBY & SON, Morecambe.
 751 III. (10s.)—G. NURSE, 22 Wellington Street, Canton, Cardiff.
 747 R. N. & H. C.—DENYER & IVE, Walton Road, East Molesey.

Class 421.—*Dorking Cocks or Cockerels.* [5 entries, 1 absent.]

- 753 I. (30s.), & 755 II. (20s.)—J. BRENNAND, Baldersby Park, Thirsk.
 756 III. (10s.), & 754 R. N. & H. C.—ARTHUR C. MAJOR, Ditton, Langley, Bucks.

Class 422.—*Dorking Hens or Pullets.* [9 entries, 1 absent.]

- 761 I. (30s.), & 764 III. (10s.)—ARTHUR C. MAJOR, Ditton, Langley, Bucks.
 762 II. (20s.)—REV. ISAAC WALTON, Newbiggin Rectory, Carlisle.
 759 R. N. & H. C.—THOMAS BRIDEN, Cononley, Keighley.

Class 423.—*Red Sussex Cocks.* [9 entries, 1 absent.]

- 766 I. (30s. & Champion.¹)—J. BAILY & SON, Heathfield, Sussex.
 767 II. (20s. & R. N. for Champion.²)—E. T. B. COPPARD, The Glen, Mayfield, Sussex.
 769 III. (10s.)—LORD ROTHSCHILD, Tring Park, Herts.
 774 R. N. & H. C.—FRANK H. WHEELER, Bridge House, Marden, Kent.

Class 424.—*Red Sussex Hens.* [5 entries, 1 absent.]

- 776 I. (30s.)—E. T. B. COPPARD, The Glen, Mayfield, Sussex.
 777 II. (20s.)—LORD ROTHSCHILD, Tring Park, Herts.
 775 III. (10s.)—J. BAILY & SON, Heathfield, Sussex.

Class 425.—*Red Sussex Cockerels.* [4 entries.]

- 781 I. (30s.)—LORD ROTHSCHILD, Tring Park, Herts.
 780 II. (20s.)—E. T. B. COPPARD, The Glen, Mayfield, Sussex.
 783 III. (10s.)—FRANK H. WHEELER, Bridge House, Marden, Kent.
 782 R. N. & H. C.—A. SPARK, Maynard Green, Horeham Road.

Class 426.—*Red Sussex Pullets.* [4 entries, 1 absent.]

- 784 II. (20s.)—E. T. B. COPPARD, The Glen, Mayfield, Sussex.
 785 III. (10s.)—LORD ROTHSCHILD, Tring Park, Herts.
 787 R. N. & H. C.—FRANK H. WHEELER, Bridge House, Marden, Kent.

Class 427.—*Light Sussex Cocks.* [4 entries.]

- 790 I. (30s.)—WILLIAM HODGES, Oatlands Farm, Weybridge.
 788 II. (20s.)—J. BAILY & SON, Heathfield, Sussex.
 789 III. (10s.)—JAMES S. HEPBURN, Home Farm, Horham, Eye.
 791 R. N. & H. C.—LORD ROTHSCHILD, Tring Park, Herts.

Class 428.—*Light Sussex Hens.* [9 entries, 2 absent.]

- 795 I. (30s.)—WILLIAM HODGES, Oatlands Farm, Weybridge.
 792 II. (20s.)—J. BAILY & SON, Heathfield, Sussex.
 794 III. (10s.)—JAMES S. HEPBURN, Home Farm, Horham, Eye.
 797 R. N. & H. C.—LORD ROTHSCHILD, Tring Park, Herts.

Class 429.—*Light Sussex Cockerels.* [7 entries, 1 absent.]

- 806 I. (30s., & R. N. for Champion.³), & 801 III. (10s.)—J. BAILY & SON, Heathfield.
 802 II. (20s.)—WILLIAM HODGES, Oatlands Farm, Weybridge.
 804 R. N. & H. C.—LORD ROTHSCHILD, Tring Park, Herts.

Class 430.—*Light Sussex Pullets.* [10 entries, 2 absent.]

- 814 I. (30s., & Champion.³), & 810 R. N. & H. C.—WILLIAM HODGES, Oatlands Farm, Weybridge.
 813 II. (20s.)—J. BAILY & SON, Heathfield, Sussex.
 812 III. (10s.)—LORD ROTHSCHILD, Tring Park, Herts.

Class 431.—*Speckled Sussex Cocks.* [7 entries, 1 absent.]

- 818 I. (30s., & R. N. for Champion.³), & 823 III. (10s.)—J. BAILY & SON, Heathfield, Sussex.
 824 II. (20s.)—SANDERSON BROTHERS, Lower Lodge Poultry Farm, Billingshurst.
 822 R. N. & H. C.—FRANK H. WHEELER, Bridge House, Marden, Kent.

¹ Silver Serviette Ring given by the Sussex Poultry Club for the best Red Sussex in Classes 423-426.

² Silver Serviette Ring given by the Sussex Poultry Club for the best Light Sussex in Classes 427-430.

³ Silver Serviette Ring given by the Sussex Poultry Club for the best Speckled Sussex in Classes 431-434.

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Class 432.—*Speckled Sussex Hens*. [9 entries, none absent.]

- 827 I. (30s., & Champion.¹)—W. H. EDWARDS, Brookfield, Pinhoe, Exeter.
 825 II. (20s.)—J. BAILY & SON, Heathfield, Sussex.
 826 III. (10s.)—F. W. BUCKINGHAM, 8 The Terrace, Tonbridge.
 830 R. N. & H. C.—SANDERSON BROTHERS, Lower Lodge Poultry Farm, Billingshurst.

Class 433.—*Speckled Sussex Cockerels*. [12 entries, 3 absent.]

- 839 I. (30s.), & 834 R. N. & H. C.—J. BAILY & SON, Heathfield, Sussex.
 841 II. (20s.)—CAPT. & MRS. SPENCER, Dean Lodge, Iron Acton, Bristol.
 835 III. (10s.)—E. G. GRANT, Fisher Hill Poultry Farm, Chiddingfold, Godalming.

Class 434.—*Speckled Sussex Pullets*. [12 entries, none absent.]

- 855 I. (30s.)—CAPT. & MRS. SPENCER, Dean Lodge, Iron Acton, Bristol.
 846 II. (20s.)—J. BAILY & SON, Heathfield, Sussex.
 849 III. (10s.), & 857 R. N. & H. C.—E. G. GRANT, Fisher Hill Poultry Farm, Chiddingfold, Godalming.

Class 435.—*British Rhode Island Red Cocks or Cockerels*.

[21 entries, 5 absent.]

- 871 I. (30s.)—J. RUSSEL, Halstead Place, Sevenoaks.
 863 II. (20s.), & 859 III. (10s.)—HAROLD BENNETT, The Fields, Alsagar, Stoke-on-Trent
 870 R. N. & H. C.—MRS. G. W. RACKHAM, Hill House, Hethel, Norwich.

Class 436.—*British Rhode Island Red Hens or Pullets*.

[20 entries, 5 absent.]

- 879 I. (30s.), & 883 II. (20s.)—HAROLD BENNETT, The Fields, Alsagar, Stoke-on-Trent.
 891 III. (10s.)—MRS. M. HIGGINBOTTOM, Gwastadd Hall, Wrexham.
 893 R. N. & H. C.—ROBERT VAIR, Rhodelands, Dunblane, N.B.

Class 437.—*Ancona Cocks or Cockerels*. [5 entries, none absent.]

- 899 I. (30s.)—JOSEPH EADSON, Park Villa, Ightenhill, Burnley.
 902 II. (20s.)—THOMAS WHITTAKER, The Laund, Accrington.
 901 III. (10s.)—MRS. SUTCLIFFE, 82 Montrose Street, Burnley.
 900 R. N. & H. C.—WILLIAM NELSON, Jumble Hall Bar, Baxenden, Accrington.

Class 438.—*Ancona Hens or Pullets*. [9 entries, none absent.]

- 907 I. (30s.)—MRS. G. H. SHORTT, Southwick Rectory, Sunderland.
 910 II. (20s.)—THOMAS WHITTAKER, The Laund, Accrington.
 906 III. (10s.), & 911 R. N. & H. C.—WILLIAM NELSON, Jumble Hall Bar, Baxenden.

Class 439.—*Yokohama Cocks or Cockerels*. [8 entries, 1 absent.]

- 913 I. (30s., & Champion²), & 918 R. N. & H. C.—MRS. L. H. BARNARD, The Red House, Wellington College, Berks.
 915 II. (20s.), & R. N. for Champion², & 919 III. (10s.)—MRS. L. C. PRIDEAUX, Spring Cottage, Lindfield, Haywards Heath.

Class 440.—*Yokohama Hens or Pullets*. [5 entries, none absent.]

- 922 I. (30s.), & 925 II. (20s.)—MRS. L. C. PRIDEAUX, Spring Cottage, Lindfield, Haywards Heath.
 923 III. (10s.)—MRS. G. H. SHORTT, Southwick Rectory, Sunderland.
 921 R. N. & H. C.—R. SCOTT MILLER, Greenoakhill, Broomhouse, Glasgow.

Class 441.—*Brahma Cocks or Cockerels*. [8 entries, none absent.]

- 932 I. (30s.)—J. C. TOZER, Stoke House, Devonport.
 926 II. (20s.)—E. R. CRIPPEN, Merrilocks Poultry Farm, Blundellsands, Liverpool.
 928 III. (10s.)—JAMES LORD, Underbank, Thornton, Poulton-le-Fylde.
 927 R. N. & H. C.—M. EWBANK, Cawton, Hovingham, Malton.

Class 442.—*Brahma Hens or Pullets*. [6 entries, none absent.]

- 934 I. (30s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
 938 II. (20s.)—S. W. THOMAS, Glasfryn, Forest Fach, Swansea.
 939 III. (10s.)—ARTHUR E. WARD, Great Warford, Mobberley, Cheshire.
 935 R. N. & H. C.—E. R. CRIPPEN, Merrilocks Poultry Farm, Blundellsands, Liverpool.

Class 443.—*Cochin Cocks or Cockerels*. [4 entries, 1 absent.]

- 941 I. (30s.), & 943 III. (10s.)—GEORGE H. PROCTER, Flass House, Durham.
 940 II. (20s.)—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.

¹ Silver Serviette Ring given by the Sussex Poultry Club for the best Speckled Sussex in Classes 431-434.

² Silver Medal given by the Yokohama Club for the best Yokohama in Classes 439 and 440.

Class 444.—Cochin Hens or Pullets. [4 entries.]

- 944 I. (30s.), & 947 II. (20s.)—GEORGE H. PROCTER, Flass House, Durham.
 945 III. (10s.)—ALAN T. STOREY, Brock House Poultry Farm, Freshfield, Liverpool.
 946 R. N. & H. C.—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 445.—Maline Cocks or Cockerels. [10 entries, 1 absent.]

- 950 I. (30s., Champion,¹ & R. N. for Champion.²)—MRS. TERROT, Wispington House, Cookham.
 953 II. (20s.) & 955 R. N. & H. C.—MRS. F. HERBERT, Ty-Gwgan, Raglan, Mon.
 952 III. (10s.)—S. W. THOMAS, Glasfryn, Forest Fach, Swansea.

Class 446.—Maline Hens or Pullets. [12 entries, none absent.]

- 968 I. (30s., & Champion.²)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 963 II. (20s., & R. N. for Champion.¹), & 965 R. N. & H. C.—MRS. TERROT, Wispington House, Cookham.
 964 III. (10s.)—MRS. F. HERBERT, Ty-Gwgan, Raglan, Mon.

Class 447.—Campine Cocks or Cockerels. [11 entries, 2 absent.]

- 976 I. (30s., & R. N. for Champion.³), & 979 R. N. & H. C.—MRS. J. J. WINSLOE, Dunsdale, Frodsham.
 971 II. (20s.)—RICHARD EDWARDS, Staunton Old Court, Staunton-on-Arrow.
 978 III. (10s.)—A. M. JAMESON, Oak Lodge Poultry Farm, Takeley.

Class 448.—Campine Hens or Pullets. [15 entries, 1 absent.]

- 985 I. (30s., & Champion.³)—A. M. JAMESON, Oak Lodge Poultry Farm, Takeley.
 981 II. (20s.)—MRS. R. ISABEL BASTARD, Lyneham, Yealmpton, Plymouth.
 994 III. (10s.)—MRS. J. J. WINSLOE, Dunsdale, Frodsham.
 993 R. N. & H. C.—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 449.—Faverolle Cocks or Cockerels. [11 entries, 3 absent.]

- 1006 I. (30s.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 996 II. (20s.)—GEORGE BETTS, Goostrey, Cheshire.
 1002 III. (10s.)—J. G. PHILLIPS, 93 St. Sepulchre Gate, Doncaster.
 999 R. N. & H. C.—F. W. GENTLE, Avenue Poultry Farm, Brandon.

Class 450.—Faverolle Hens or Pullets. [12 entries, 2 absent.]

- 1018 I. (30s.), 1015 III. (10s.), & 1017 R. N. & H. C.—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 1009 II. (20s.)—C. H. BRADLEY, Drivers Farm, Tibberton, Glos.

Class 451.—Houdan Cocks or Cockerels. [6 entries, none absent.]

- 1023 I. (30s.), & 1020 III. (10s.)—HENRY EDYE, South Binns, Heathfield.
 1022 II. (20s.)—S. W. THOMAS, Glasfryn, Forest Fach, Swansea.
 1021 R. N. & H. C.—J. W. MOORE, Oakerlands Farm, Hexham.

Class 452.—Houdan Hens or Pullets. [6 entries, none absent.]

- 1028 I. (30s.), & 1030 II. (20s.)—S. W. THOMAS, Glasfryn, Forest Fach, Swansea.
 1027 III. (10s.)—J. W. MOORE, Oakerlands Farm, Hexham.
 1026 R. N. & H. C.—HENRY EDYE, South Binns, Heathfield, Sussex.

Class 453.—Cocks or Cockerels, any other breed except Bantams.

[9 entries, none absent.]

- 1034 I. (30s.)—C. E. PICKLES, Kayfield House, Earby, Yorks. (Black Hamburg.)
 1031 II. (20s.)—MISS ASHWELL, Finmere, Buckingham. (Hamburg.)
 1036 III. (10s.)—S. W. THOMAS, Glasfryn, Forest Fach, Swansea. (Crève.)
 1033 R. N. & H. C.—W. PICKERING, Pickering. (White Malay.)

Class 454.—Hens or Pullets, any other breed, except Bantams.

[11 entries, none absent.]

- 1048 I. (30s.), & 1050 R. N. & H. C.—TURTON & SON, Nesfield and Rutland Buildings, Ilkeston. (Hamburg.)
 1040 II. (20s.)—THOMAS ABBOT, Wymondham. (Andalusian.)
 1047 III. (10s.)—S. W. THOMAS, Glasfryn, Forest Fach, Swansea. (Crève.)

Class 455.—Old English Game Bantam Cocks. [7 entries, 1 absent.]

- 1052 I. (30s.)—J. F. ENTWISLE, The Firs, Calder Grove, Wakefield.
 1051 II. (20s.)—J. DAWSON, Billington, Whalley, Blackburn.
 1056 III. (10s.)—R. S. MARSDEN, Rimington, Clithero.
 1057 R. N. & H. C.—WILLIAM THOMAS, 150 Caerau Road, Caerau, Bridgend.

¹ Silver Medal given by the Malines Poultry Club for the best Maline Cock or Hen other than Coucou in Classes 445 and 446.

² Silver Medal given by the Malines Poultry Club for the best Coucou de Maline Cock or Hen in Classes 445 and 446.

³ Silver Medal given through the Campine Club for the best Campine in Classes 447 and 448.

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Class 456.—*Old English Game Bantam Hens.* [7 entries, 1 absent.]

- 1064 I. (30s.). & 1059 II. (20s.).—J. DAWSON, Billington, Whalley, Blackburn.
 1062 III. (10s.).—T. C. HEATH, Keele, Newcastle, Staffs.
 1060 R. N. & H. C.—J. F. ENTWISLE, The Firs, Calder Grove, Wakefield.

Class 457.—*Modern Game Bantam Cocks, any colour.*

[10 entries, none absent.]

- 1070 I. (30s.). & 1073 III. (10s.).—W. SMITH LAMBERT, Drabble House Farm, Silsden.
 1065 II. (20s.).—J. BRENNAND, Baldersby Park, Thirsk.
 1074 R. N. & H. C.—HENRY V. MACHIN, Gateford Hill, Worksop.

Class 458.—*Modern Game Bantam Hens, any colour.*

[9 entries, none absent.]

- 1075 I. (30s.).—J. BRENNAND, Baldersby Park, Thirsk.
 1080 II. (20s.).—HENRY V. MACHIN, Gateford Hill, Worksop.
 1081 III. (10s.).—TOM TAYLOR, Darley Bank, Worsboro' Dale, Barnsley.
 1078 R. N. & H. C.—ROBERT HIRST, Fieldhead, Cleckheaton.

Class 459.—*Sebright Bantam Cocks.* [6 entries, none absent.]

- 1083 I. (30s.). & 1089 II. (20s.).—MISS K. D. PRESTON, Bay House, Ellet, Lancaster.
 1086 III. (10s.).—A. R. FISH, Holme Mead, Hutton, Preston.
 1085 R. N. & H. C.—J. F. ENTWISLE, The Firs, Calder Grove, Wakefield.

Class 460.—*Sebright Bantam Hens.* [9 entries, 1 absent.]

- 1092 I. (30s.).—A. R. FISH, Holme Mead, Hutton, Preston.
 1094 II. (20s.).—R. S. MARSDEN, Rimington, Clitheroe.
 1093 III. (10s.).—MISS K. D. PRESTON, Bay House, Ellet, Lancaster.
 1093 R. N. & H. C.—W. & J. H. HEYS, Mount Henley, Rochdale.

Class 461.—*Wyandotte Bantam Cocks.* [5 entries, none absent.]

- 1099 I. (30s.). & 1102 R. N. & H. C.—W. & J. H. HEYS, Mount Henley, Rochdale.
 1100 II. (20s.).—R. S. MARSDEN, Rimington, Clitheroe.
 1103 III. (10s.).—MRS. IRENE OSGOOD, Guilsborough Hall, Northampton.

Class 462.—*Wyandotte Bantam Hens.* [1 entry.]

- 1104 I. (30s.).—R. S. MARSDEN, Rimington, Clitheroe.

Class 463.—*Yokohama Bantam Cocks or Cockerels.* [9 entries, none absent.]

- 1106 I. (30s., & Champion¹), & 1110 II. (20s.).—F. J. S. CHATTERTON, 34 Elm Park Road, Finchley.
 1111 III. (10s.).—MRS. SHARRER, Little Combe Bank, Sundridge, Sevenoaks.
 1105 R. N. & H. C.—ERNEST BROWN, Langborough, Wokingham.

Class 464.—*Yokohama Bantam Hens or Pullets.* [9 entries, none absent.]

- 1116 I. (30s. & R. N. for Champion¹), & 1120 II. (20s.).—F. J. S. CHATTERTON, 34 Elm Park Road, Finchley.
 1124 III. (10s.).—MRS. SHARRER, Little Combe Bank, Sundridge, Sevenoaks.
 1115 R. N. & H. C.—ERNEST BROWN, Langborough, Wokingham.

Class 465.—*Bantam Cocks, any other variety.* [12 entries, none absent.]

- 1129 I. (30s.), & 1131 II. (20s.).—W. SMITH LAMBERT, Drabble House Farm, Silsden.
 1134 III. (10s.).—ROBERT WILLIAMSON, The Grange, Hednesford.
 1133 R. N. & H. C.—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 466.—*Bantam Hens, any other variety.* [11 entries, 1 absent.]

- 1138 I. (30s.).—J. F. ENTWISLE, The Firs, Calder Grove, Wakefield.
 1146 II. (20s.).—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
 1141 III. (10s.).—W. SMITH LAMBERT, Drabble House Farm, Silsden, Keighley.
 1140 R. N. & H. C.—W. & J. H. HEYS, Mount Henley, Rochdale.

Class 467.—*Aylesbury Drakes or Ducks, bred prior to 1912.*

[6 entries, none absent.]

- 1152 I. (30s.), & 1150 II. (20s.).—MRS. SUTCLIFFE, 82 Montrose Street, Burnley.
 1151 III. (10s.).—J. Y. WHEATLEY, Prospect House, Appleton Roebuck, Bolton Percy.
 1149 R. N. & H. C.—JAMES HUNTLY & SON, Hirsal Poultry Farm, Coldstream, N.B.

Class 468.—*Aylesbury Drakes or Ducks, bred in 1912.* [6 entries, 1 absent.]

- 1156 I. (30s.).—J. LONGSON & SON, Buxted Road, Chapel-en-le-Frith.
 1157 II. (20s.), & 1159 III. (10s.).—J. Y. WHEATLEY, Prospect House, Appleton Roebuck.
 1154 R. N. & H. C.—WILLIAM BYGOTT, Ryehill, Wing, Oakham.

¹ Silver Medal given by the Yokohama Club for the best Yokohama Bantam in Classes 463 and 464.

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Class 469.—*Rouen Drakes or Ducks, bred prior to 1912.*

[11 entries, 1 absent.]

- 1170 I. (30s.)—MRS. SUTCLIFFE, 82 Montrose Street, Burnley.
- 1169 II. (20s.)—WILLIAM BYGOTT, Ryehill, Wing, Oakham.
- 1160 III. (10s.)—R. ANTHONY, Home Farm, Euxton, Chorley.
- 1166 R. N. & H. C.—J. E. D. MOYSEY, Venton, Totnes.

Class 470.—*Rouen Drakes or Ducks, bred in 1912.* [2 entries.]

- 1172 I. (30s.), & 1171 II. (20s.)—WILLIAM BYGOTT, Ryehill, Wing, Oakham.

Class 471.—*Blue Orpington Drakes or Ducks, bred prior to 1912.*

[6 entries, none absent.]

- 1178 I. (30s.), & 1176 II. (20s.)—J. E. D. MOYSEY, Venton, Totnes.
- 1177 III. (10s.)—J. Y. WHEATLEY, Prospect House, Appleton Roebuck, Bolton Percy.
- 1175 R. N. & H. C.—WILLIAM H. COOK, Model Poultry Farm, St. Paul's Cray.

Class 472.—*Blue Orpington Drakes or Ducks, bred in 1912.*

[6 entries none absent.]

- 1181 I. (30s.)—J. E. D. MOYSEY, Venton, Totnes.
- 1179 II. (20s.)—MRS. R. ISABEL BASTARD, Lyneham, Yealmpton, Plymouth.
- 1180 III. (10s.)—WILLIAM BYGOTT, Ryehill, Wing, Oakham.
- 1182 R. N. & H. C.—J. Y. WHEATLEY, Prospect House, Appleton Roebuck, Bolton Percy.

Class 473.—*Drakes or Ducks, any other breed, bred prior to 1912.*

[11 entries, 1 absent.]

- 1186 I. (30s.)—TOM H. FURNESS, Carlton House, Chesterfield.
- 1194 II. (20s.)—MRS. SUTCLIFFE, 82 Montrose Street, Burnley.
- 1188 III. (10s.)—JAMES HUNTLY & SON, Hirsell Poultry Farm, Coldstream, N.B.
- 1190 R. N. & H. C.—JAMES KEAY, JUN., Strone Cottage, Bridge of Cally, Blairgowrie, N.B.

Class 474.—*Drakes or Ducks, any other breed, bred in 1912.*

[8 entries, 1 absent.]

- 1198 I. (30s.)—TOM H. FURNESS, Carlton House, Chesterfield.
- 1202 II. (20s.)—J. Y. WHEATLEY, Prospect House, Appleton Roebuck, Bolton Percy.
- 1203 III. (10s.)—STANLEY STREET, The Manor, Coveney, Isle of Ely.
- 1200 R. N. & H. C.—JAMES HUNTLY & SON, Hirsell Poultry Farm, Coldstream, N.B.

Class 475.—*Ganders, any variety.* [9 entries, 1 absent.]

- 1206 I. (30s.)—ALFRED BIRCH, Edge Farm, Sefton, Liverpool. (Embsden.)
- 1204 II. (20s.)—ABBOT BROTHERS, Thuxton, Norfolk.
- 1207 III. (10s.)—WILLIAM BYGOTT, Ryehill, Wing, Oakham. (Toulouse.)
- 1209 R. N. & H. C.—W. F. SNELL, Marsh Farm, Yeovil. (Toulouse.)

Class 476.—*Geese, any variety.* [8 entries, 1 absent.]

- 1215 I. (30s.)—WILLIAM BYGOTT, Ryehill, Wing, Oakham. (Toulouse.)
- 1217 II. (20s.)—STUART SMITH, Manor House, Wilford, Nottingham. (Toulouse.)
- 1216 III. (10s.)—J. E. D. MOYSEY, Venton, Totnes. (Embsden.)
- 1213 R. N. & H. C.—ABBOT BROTHERS, Thuxton, Norfolk.

Class 477.—*Turkey Cocks.* [11 entries, 2 absent.]

- 1226 I. (30s.)—ABBOT BROTHERS, Thuxton, Norfolk.
- 1225 II. (20s.)—MRS. E. A. LYCETT GREEN, Darrington Hall, Pontefract.
- 1230 III. (10s.)—JOHN W. NEWSAM, Town Farm, Langton, Malton.
- 1222 R. N. & H. C.—THOMAS ABBOT, Wymondham, Norfolk.

Class 478.—*Turkey Hens.* [11 entries, none absent.]

- 1232 I. (30s.)—ABBOT BROTHERS, Thuxton, Norfolk.
- 1235 II. (20s.)—J. H. FOWLER, Rignall Farm, Great Missenden.
- 1233 III. (10s.)—THOMAS ABBOT, Wymondham, Norfolk.
- 1239 R. N. & H. C.—L. F. MAYCOCK, Potcote Lodge, Towcester.

FARM AND DAIRY PRODUCE OF THE UNITED KINGDOM.

Butter.

Class 479.—*Boxes of Twelve 2-lb. Rolls or Squares of Butter, made with not more than 1 per cent. of salt.* [1 entry.]

- 1 I. (£3.)—MRS. W. E. MUDD, Slade House, Thornthwaite, Darley, Leeds.

Class 480.—*Two Pounds of Fresh Butter, without any salt, made up in plain pounds from the milk of Channel Island, Devon, or South Devon Cattle and their crosses.* [16 entries, 2 absent.]

17 I. (£3.)—MRS. JOHN WAY, West Bridge, Bishopsnympton, South Molton.

9 II. (£2.)—COLONEL LAYCOCK, Wiseton, Bawtry.

12 III. (£1.)—MRS. WILLIAM RAMSHAW, Low Farm, Kirkleatham, Redcar.

13 R. N. & H. C.—MRS. G. B. ROBINSON, Poole House Farm, Nantwich.

Class 481.—*Two Pounds of Fresh Butter, without any salt, made up in plain pounds from the milk of Cattle of any breed or cross other than those mentioned in Class 480.* [19 entries, none absent.]

35 I. (£3.)—MISS URWIN, Dunskins, Wolsingham.

33 II. (£2.)—MRS. H. THOMAS, Neve House Farm, Llanbleithan, Cowbridge.

19 III. (£1.)—MISS SARAH ANN CLIFFE, Egmanton, Newark.

28 R. N. & H. C.—MRS. W. MILNER, Clifton, Maltby, Rotherham.

Class 482.—*Two Pounds of Fresh Butter, slightly salted, made up in plain pounds from the milk of Channel Island, Devon, or South Devon Cattle and their crosses.* [16 entries, 2 absent.]

46 I. (£3.)—MRS. H. PENDLEBURY, Brook Fold Farm, Harwood, Bolton.

48 II. (£2.)—MRS. G. B. ROBINSON, Poole House Farm, Nantwich.

41 III. (£1.)—MRS. FAUDEL-PHILLIPS, Mapleton Stud, Edenbridge.

49 R. N. & H. C.—R. J. STREATFEILD, Ros-ington Hall, Bawtry.

Class 483.—*Two Pounds of Fresh Butter, slightly salted, made up in plain pounds from the milk of Cattle of any breed or cross other than those mentioned in Class 482.* [25 entries, 1 absent.]

76 I. (£3.)—MISS URWIN, Dunskins, Wolsingham.

71 II. (£2.)—MISS DOROTHY M. SHAW, Kitchen Grounds Farm, Ellel, Lancaster.

73 III. (£1.)—MRS. M. STOKES, Heddon House Dairy, Wylam-on-Tyne.

63 R. N. & H. C.—MRS. LECKENBY, South Farm, Letwell, Rotherham.

Class 484.—*Three Pounds of Fresh Butter, slightly salted, made up in pounds in the most attractive marketable designs, and packed in non-returnable boxes for transmission by rail or parcel post.*

[11 entries, none absent.]

83 I. (£3.)—MRS. L. R. MILDON, Higher Mead Down, Rackenford, Devon.

87 II. (£2.)—MRS. G. B. ROBINSON, Poole House Farm, Nantwich.

88 III. (£1.)—GEORGE VENNING, Langunnet Barton, Lerryn, Lostwithiel.

78 R. N. & H. C.—MRS. A. A. BERE, Stoodleigh Barton, Tiverton.

Cheese.

Made in 1912.

Class 485.—*Three Cheddar Cheeses, of not less than 50 lb. each.*

[14 entries, 3 absent.]

94 I. (£5.)—P. H. FRANCIS, Folly Farm, Upton Noble, Bruton.

92 II. (£3.)—ALEXANDER CROSS, Knockdon Farm, Maybole.

90 III. (£2.)—E. BRAKE, Discove Dairy, Bruton.

91 R. N. & H. C.—JOHN CAMPELL, Dromore Dairy, Kirkcudbright.

Class 486.—*Three Cheddar Trunchles.* [15 entries, 4 absent.]

115 I. (£4.)—ROBERT STEVENSON, Boghead, Galston, Ayrshire.

105 II. (£2.)—JOHN CAMPELL, Dromore Dairy, Kirkcudbright.

103 III. (£1.)—ROBERT BOARD, The Poplars, Edingworth, Weston-super-Mare.

106 R. N. & H. C.—JOSEPH CANDY, Temple House Farm, Shepton Mallet.

Class 487.—*Three Coloured Cheshire Cheeses, of not less than 40 lb. each.*

[37 entries, 14 absent.]

138 I. (£5.)—THE REPRESENTATIVES OF W. R. JONES, Moat Farm, Wrexham Road, Chester.

123 II. (£3.)—EDWIN COOKSON, Poulton, Pulford, Chester.

145 III. (£2.)—GEORGE PLATT, Eaton, Tarporley.

125 R. N. & H. C.—R. H. DICKIN, Affcot Manor, Church Stretton.

Class 488.—*Three Uncoloured Cheshire Cheeses, of not less than 40 lb. each.*

[24 entries, 8 absent.]

178 I. (£5.)—GEORGE WATSON, Knightley, Eccleshall, Staffs.

157 II. (£3.)—PERCY V. COOKE, Tattenhall Hall, Chester.

168 III. (£2.)—THE REPRESENTATIVES OF W. R. JONES, Moat Farm, Wrexham Road, Chester.

177 R. N. & H. C.—H. S. WALLEY, Bickerton Hall, Malpas.

Class 489.—*Three Double Gloucester Cheeses, of not less than 22 lb. each.*
[11 entries, 3 absent.]

- 182 I. (£5.)—ROBERT J. HAINE, Tower Farm, Little Wolford, Shipston-on-Stour.
186 II. (£3.)—N. J. SIMS, Pitcombe, Bruton.
179 III. (£2.)—ROBERT BOARD, The Poplars, Edingworth, Weston-super-Mare.
181 R. N. & H. C.—C. E. GILBERT, Rocester, Staffs.

Class 490.—*Three Lancashire Cheeses, not over 12 lb. each.*
[6 entries, none absent.]

- 193 I. (£4.)—WILLIAM KNOWLES, Higher Park Farm, Myerscough, Preston.
191 II. (£2.)—JAMES COWPE, Fir Trees Farm, Goosnargh, Preston.
194 III. (£1.)—JOSEPH SHEPHERD, Lower House, Inglewhite, Preston.
195 R. N. & H. C.—GEORGE WHITAKER & SON, Gibson's Farm, Kirklands, Garstang.

Class 491.—*Three Stilton Cheeses.* [14 entries, none absent.]

- 203 I. (£4.)—HENRY MORRIS, Manor Farm, Saxelby, Melton Mowbray.
201 II. (£2.)—WILLIAM JACKSON, Frisby House, Billesdon, Leicester.
197 III. (£1.)—MRS. C. FAIRBROTHER, Beeby, Leicester.
208 R. N. & H. C.—W. F. WALPOLE, South Croxton, Leicester.

Class 492.—*Three Wensleydale or Cotherstone Cheeses, Stilton Shape.*
[11 entries, none absent.]

- 216 I. (£4.)—ALFRED ROWNTREE, Coverham, Middleham, Yorks.
219 II. (£2.)—E. G. WHITELOCK, The Bryn, Attow, Ashbourne.
215 III. (£1.)—JOSEPH & HARRIET JANE PARK, Trent Side Dairy, South Leverton, Lincoln.
218 R. N. & H. C.—WENSLEYDALE PURE MILK SOCIETY, LTD., Northallerton.

Class 493.—*Three Wensleydale or Cotherstone Cheeses, Flat Shape.*
[9 entries, none absent.]

- 225 I. (£4.)—ALFRED ROWNTREE, Coverham, Middleham, Yorks.
228 II. (£2.)—E. G. WHITELOCK, The Bryn, Attow, Ashbourne.
226 III. (£1.)—THE WENSLEYDALE FARMERS' ASSOCIATION, LTD., Redmire, Yorks.
229 R. N. & H. C.—MRS. WILLIS, Manor House, Carperby, Yorks.

Class 494.—*Three Cleveland Cheeses.* [9 entries, none absent.]

- 234 I. (£4.)—MRS. ROBERT HICKS, Little Fryup, Danby, Grosmont.
232 II. (£2.)—J. T. GARBUTT, Street Farm, Easington, Yorks.
230 III. (£1.)—JOSEPH CLEMENT, Park Head Farm, Fryup, Lealholm, Gro-mont.
235 R. N. & H. C.—WILLIAM LISTER, London House, Glaisdale, Grosmont

Bread.

Made of Stone-ground Flour from Wheat grown in the British Isles only.

Class 495.—*Two Loaves of Bread, weighing 2 lb. each or thereabouts, baked in tins. Open to Professional Bakers only.* [19 entries, 2 absent.]

- 241 I. (£3., & Champion.¹)—WILLIAM COLLIER, 2 High Street, Leigh, Lancs.
240 II. (£2.)—F. O. BROCK, 20 Church Street, Kingston-on-Thames.
256 III. (£1.)—LAURENCE WITT, 34 Heath Road, Twickenham.
250 R. N. & H. C.—J. R. IRONS, Garfield Street, Watford.

Class 496.—*Two Loaves of Bread, weighing 2 lb. each or thereabouts, of any shape. Open to Professional Bakers only.* [11 entries, none absent.]

- 259 I. (£3., & R. N. for Champion.¹)—WILLIAM COLLIER, 2 High Street, Leigh, Lancs.
267 II. (£2.)—LAURENCE WITT, 34 Heath Road, Twickenham.
258 III. (£1.)—F. O. BROCK, 20 Church Street, Kingston-on-Thames.
268 R. N. & H. C.—TOM WOOD, Aylburton, Lydney, Glos.

Class 497.—*Two Loaves of Bread, weighing 2 lb. each or thereabouts, baked in tins. Professional Bakers not eligible.* [12 entries, none absent.]

- 275 I. (£3.)—MRS. A. L. PUNTER, 8 Lordship Terrace, Stoke Newington, N.
274 II. (£2.)—MRS. L. O. POWELL, Hampstead House, 80 Southtown, Great Yarmouth.
277 III. (£1.)—MISS R. E. STEVENS, Great Aish, South Brent, Devon.

Class 498.—*Two Loaves of Bread, weighing 2 lb. each or thereabouts, of any shape. Professional Bakers not eligible.* [7 entries, none absent.]

- 283 I. (£3.)—MRS. A. L. PUNTER, 8 Lordship Terrace, Stoke Newington, N.
286 II. (£2.)—MISS R. E. STEVENS, Great Aish, South Brent, Devon.
285 III. (£1.)—EDWARD STEPHENS, Langley Farm, Fiffeld, Oxford.

¹ Champion Silver Cup given by a Member of the R.A.S.E. interested in the improvement of Bread for the best exhibit in Classes 495 to 498.

Cider and Perry.

N.B.—The names of the Fruits from which the Cider or Perry is stated by the Exhibitor to have been made are added after the address of the Exhibitor. In Classes 501, 504, 505, and 506 the date of making is also given.

Class 499.—*Casks of Dry Cider, of not less than 18, and not more than 30 gallons, made in 1911.* [5 entries, none absent.]

290 I. (£4).—QUANTOCK VALE CIDER COMPANY, LTD., North Petherton, Bridgwater. (Mixed Fruit.)

289 II. (£2).—HERBERT J. DAVIS, Sutton Montis, Sparkford, Somerset. (Royal and White Jersey, and Cap of Liberty.)

Class 500.—*Casks of Sweet Cider, of not less than 18, and not more than 30 gallons, made in 1911.* [11 entries, none absent.]

300 I. (£4), & 301 III. (£1).—THOMAS STONE, Axe Vale Cider Works, Axminster. (Mixed Fruit.)

297 II. (£2).—HERBERT J. DAVIS, Sutton Montis, Sparkford, Somerset. (Royal and White Jersey, and Cap of Liberty.)

294 R. N. & H. C.—D. J. CROFTS & SON, Sutton Montis, Sparkford, Somerset. (Royal and White Jersey, White Close Pippin, Redstreak, and Cap of Liberty.)

Class 501.—*Casks of Cider, of not less than 18, and not more than 30 gallons, made previous to 1911.* [5 entries, none absent.]

305 II. (£2).—R. H. RIDLER & SON, Clehonger Manor, Hereford. (Kingston Black, 1910.)

Class 502.—*One Dozen Bottles of Dry Cider, made in 1911.*

[10 entries, none absent.]

311 I. (£4).—HERBERT J. DAVIS, Sutton Montis, Sparkford, Somerset. (Royal and White Jersey, and Cap of Liberty.)

316 II. (£2).—THOMAS STONE, Axe Vale Cider Works, Axminster. (Mixed Fruit.)

313 III. (£1).—QUANTOCK VALE CIDER COMPANY, LTD., North Petherton, Bridgwater. (Mixed Fruit.)

Class 503.—*One Dozen Bottles of Sweet Cider, made in 1911.*

[20 entries, none absent.]

319 I. (£4, & Champion.¹)—SIR JOHN HEATHCOAT AMORY, BT., Knightshayes Court, Tiverton. (Mixed Fruit.)

330 II. (£2, & R. N. for Champion.¹)—HERBERT J. DAVIS, Sutton Montis, Sparkford, Somerset. (Royal and White Jersey, and Cap of Liberty.)

329 III. (£1).—HERBERT J. DAVIS. (Harry Masters, White Jersey, Yarlington Mill, and Kingston Black.)

335 R. N. & H. C.—THOMAS STONE, Axe Vale Cider Works, Axminster. (Mixed Fruit.)

Class 504.—*One Dozen Bottles of Cider, made previous to 1911.*

[10 entries, none absent.]

344 I. (£4).—THOMAS STONE, Axe Vale Cider Works, Axminster. (Mixed Fruit, 1910.)

343 II. (£2).—R. H. RIDLER & SON, Clehonger Manor, Hereford. (Kingston Black, 1910.)

346 III. (£1).—THOMAS STONE. (Mixed Fruit, 1909.)

348 R. N. & H. C.—TILLEY BROS., Shepton Mallet. (Red and White Jersey, Kingston Black, and Doves, 1910.)

Class 505.—*One Dozen Bottles of Dry Perry.* [4 entries, 1 absent.]

[No Award.]

Class 506.—*One Dozen Bottles of Sweet Perry.* [5 entries, none absent.]

353 II. (£2).—DAVIS & SHINGLER, Marden, Hereford. (Red and Oldfield, 1911.)

354 III. (£1).—R. H. RIDLER & SON, Clehonger Manor, Hereford. (Mixed Fruit, 1910.)

Wool.

Of 1912 Clip.

Class 507.—*Three Fleeces of any Long Wool.* [15 entries, 4 absent.]

371 I. (£5).—WILLIAM B. SWALLOW, Wootton Lawn, Ulceby. (Lincoln Yearling Hogs.)

367 II. (£3).—JOHN W. HARRISON, Underpark, Lealholm, Gosmont. (Leicester Gimmer Hogs.)

362 III. (£2).—ARTHUR FINN, Westbroke House, Lydd, Kent. (Romney Marsh two-year-old Hogs.)

372 R. N. & H. C.—THE EXORS. OF THE LATE THOMAS WILLIS, Manor House, Carperby, Yorks. (Wensleydale Yearling Hogs.)

¹ Challenge Cup given by the Cider Growers of the West of England for the best exhibit in Classes 499-504.

Class 508.—*Three Fleeces of any Short Wool.* [10 entries, none absent.]

- 380 I. (£5.)—SALE & SON, Atherstone (Shropshire Yearling Hogs.)
 375 II. (£3.)—HUGH A. CHRISTY, Llangoed Castle, Llyswen, Brecon. (Ryland Shearling Hogs.)
 379 III. (£2.)—SIR EVERARD HAMBRO, K.C.V.O., Milton Abbey, Blandford. (Dorset Horn Shearling Ewes.)
 382 R. N. & H. C.—COLONEL THOMAS WOOD, Gwernyfed, Three Cocks. (Kerry Hill Yearling Theaves.)

Class 509.—*Three Fleeces of Mountain or Moorland Wool, comprising Dartmoor Exmoor, Herdwick, Welsh and Black-faced Mountain.* [7 entries, 2 absent.]

- 386 I. (£5.)—WILLIAM LEATHES, Agricultural Hall, Ruthin. (Welsh Yearlings.)
 387 II. (£3.)—WILLIAM GEORGE ROBERTS, Dysarth Hall, Flints. (Welsh Mountain Ewes.)
 385 III. (£2.)—TOM LEATHES, Wern Fawr, Ruthin. (Welsh Yearling Wethers.)
 389 R. N. & H. C.—MRS. M. E. WYNNE-FINCH, Voelas, Bettws-y-coed. (Welsh Mountain Wethers.)

HIVES, HONEY, AND BEE APPLIANCES.¹**Class 510.**—*Collections of Hives and Appliances.* [4 entries.]

- 392 I. (£4.)—W. P. MEADOWS, Syston, Leicester.
 391 II. (£2.)—LEE & SON, 4 Martineau Road, Highbury, N.
 393 III. (£1.)—E. H. TAYLOR, Welwyn, Herts.
 390 R. N. & H. C.—W. DIXON, 24 Central Road, Kirkgate, Leeds.

Class 511.—*Frame Hives, for general use, unpainted.* [6 entries, none absent.]

- 398 I. (20s.)—E. H. TAYLOR, Welwyn, Herts.
 395 II. (15s.)—LEE & SON, 4 Martineau Road, Highbury, N.
 394 III. (10s.)—W. DIXON, 24 Central Road, Kirkgate, Leeds.
 399 R. N. & H. C.—H. G. TUNSTALL, Ashfield, Rainhill.

Class 512.—*Frame Hives, for Cottager's use, unpainted.* [3 entries.]

- 402 I. (20s.)—E. H. TAYLOR, Welwyn, Herts.
 400 II. (15s.)—LEE & SON, 4 Martineau Road, Highbury, N.
 401 III. (10s.)—W. P. MEADOWS, Syston, Leicester.

Class 513.—*Honey Extractors.²* [5 entries, 1 absent.]

- 407 I. (15s.)—E. H. TAYLOR, Welwyn, Herts.
 406 II. (10s.)—W. P. MEADOWS, Syston, Leicester.

Class 514.—*Observatory Hives, with not less than three Brood Frames, with Bees and Queen.* [4 entries, 1 absent.]

- 409 I. (20s.)—LEE & SON, 4 Martineau Road, Highbury, N.
 411 II. (15s.)—T. W. SWABEY, Bracebridge Heath, Lincoln.
 408 III. (10s.)—W. DIXON, 24 Central Road, Kirkgate, Leeds.

Class 515.—*Any appliances connected with Bee-keeping, to which no prize has been awarded at a Show of the R.A.S.E.* [7 entries, 1 absent.]

- 415 I. (10s.)—LEE & SON, 4 Martineau Road, Highbury, N.
 418 Certificate of Merit.—W. P. MEADOWS, Syston, Leicester.

Class 516.—*Comb Honey.³* [6 entries, 1 absent.]

- 422 I. (10s.)—P. M. RALPH, Jessamine Apiary, Settle.

Class 517.—*Run or Extracted Light-coloured Honey.* [6 entries, 4 absent.]

- 428 I. (10s.)—P. M. RALPH, Jessamine Apiary, Settle.
 425 II. (7s. 6d.)—F. A. BEAN, Snaith, Yorks.

Class 518.—*Collective Exhibits of Comb Honey, Run or Extracted Light Coloured Honey, and Bees Wax.* [1 entry.]

[No Award.]

¹ Prizes given by the British Bee Keepers' Association.² Prizes given by Mr. T. W. Cowan.³ Entries in Classes 516-518 can only be made by members of the Yorkshire Bee Keepers' Association.

Class 519.—*Comb Honey*.¹ [10 entries, 6 absent.]

- 438 I. (20s.)—J. G. NICHOLSON, The Apiary, Langwathby.
 439 II. (15s.)—J. PEARMAN, Penny Long Lane, Derby.
 446 III. (10s.)—G. MARSHALL, Worwell, Newark.

Class 520.—*Run or Extracted Light-coloured Honey*. [21 entries, 6 absent.]

- 459 I. (20s.)—J. PEARMAN, Penny Long Lane, Derby.
 443 II. (15s.)—W. BARLOW, High Legh, Knutsford.
 456 III. (10s.)—R. MORGAN, The Apiary, Cowbridge.
 447 R. N. & H. C.—A. S. DELL, County Apiaries, Leigh, Lancs.

Class 521.—*Run or Extracted Medium or Dark-coloured Honey*.
[10 entries, 1 absent.]

- 470 I. (20s.)—T. MANFIELD, Hillside Lodge, Newark.
 466 II. (15s.)—F. HARRIS, High Ferry, Sibsey, Boston.
 464 III. (10s.)—T. A. DENNISON, The Laurels, Stockton, Rugby.
 469 R. N. & H. C.—G. MARSHALL, Worwell, Newark.

Class 522.—*Granulated Honey*. [6 entries, none absent.]

- 478 I. (20s.)—J. WOODS, 10 Church Warsop, Macclesfield.
 476 II. (15s.)—J. PEARMAN, Penny Long Lane, Derby.
 473 III. (10s.)—E. CHURCH, Masonic Temple, Cardiff.

Class 523.—*Comb Honey*.² [8 entries, 3 absent.]

- 485 I. (20s.)—A. HISCOCK, Loddington, Kettering.
 482 II. (15s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.
 481 III. (10s.)—E. E. BROWN, Holmercroft Apiary, Melbourn, Cambs.
 483 R. N. & H. C.—G. BRYDEN, 46 Starr Hill, Rochester.

Class 524.—*Run or Extracted Light-coloured Honey*.
[8 entries, 2 absent.]

- 487 I. (20s.)—R. ALLEN, Tusmore, Bicester.
 491 II. (15s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.
 490 III. (10s.)—E. E. BROWN, Holmercroft Apiary, Melbourn, Cambs.
 493 R. N. & H. C.—G. W. KIRBY, 17 Priory Road, Knowle, Bristol.

Class 525.—*Run or Extracted Medium or Dark-coloured Honey*.
[6 entries, 1 absent.]

- 496 I. (20s.)—C. E. BILLSON, Cranford, Kettering.
 498 II. (15s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.
 500 III. (10s.)—G. W. KIRBY, 17 Priory Road, Knowle, Bristol.

Class 526.—*Granulated Honey*. [7 entries, none absent.]

- 505 I. (20s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.
 504 II. (15s.)—E. E. BROWN, Holmercroft Apiary, Melbourn, Cambs.
 501 III. (10s.)—R. ALLEN, Tusmore, Bicester.
 506 R. N. & H. C.—REV. F. E. CRATE, Salcott Virley, Witham.

Class 527.—*Shallow Frames of Comb Honey, for extracting*.
[8 entries, 5 absent.]

- 511 I. (20s.)—G. BRYDEN, 46 Star Hill, Rochester.
 510 II. (15s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.

Class 528.—*Heather Honey*. [12 entries, 1 absent.]

- 520 I. (20s.)—T. HOOD, Marine Parade, Whitby.
 522 II. (15s.)—M. J. LAMBOLL, Liddinghurst, Chiddingfold, Surrey.
 526 III. (10s.)—E. W. SPINK, Green Tree, Easingwold.
 517 R. N. & H. C.—J. BERRY, The Apiary, Llanrwst.

Class 529.—*Heather Mixture Extracted Honey*. [6 entries, none absent.]

- 530 I. (20s.)—G. H. & T. S. ELLIOT, Southwell, Notts.
 529 II. (15s.)—W. DIXON, 27 Central Road, Kirkgate, Leeds.
 532 III. (10s.)—J. PEARMAN, Penny Long Lane, Derby.
 528 R. N. & H. C.—J. BERRY, The Apiary, Llanrwst.

¹ Entries in Classes 519-522 can only be made by residents in Cheshire, Cumberland, Derbyshire, Durham, Herefordshire, Lancashire, Leicestershire, Lincolnshire, Monmouthshire, Northumberland, Nottinghamshire, Rutland, Shropshire, Staffordshire, Warwickshire, Westmorland, Worcestershire, Yorkshire, the Isle of Man, Ireland, Scotland, or Wales.

² Entries in Classes 523-526 can only be made by residents in Bedfordshire, Berkshire, Buckinghamshire, Cambridgeshire, Cornwall, Devon, Dorset, Essex, Gloucestershire, Hampshire, Hertfordshire, Huntingdonshire, Isle of Wight, Kent, Middlesex, Norfolk, Northamptonshire, Oxfordshire, Somerset, Suffolk, Surrey, Sussex, or Wiltshire.

Class 530.—Best and Most Attractive Displays of Honey.

[6 entries, none absent.]

- 536 I. (30s.), & 537 R. N. & H. C.—W. DIXON, 27 Central Road, Kirkgate, Leeds.
 534 II. (20s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.
 538 III. (10s.)—J. PEARMAN, Penny Long Lane, Derby.

Class 531.—Exhibits of not less than 2 lb. of Wax, the Produce of the Exhibitor's Apiary. [10 entries, 3 absent.]

- 547 I. (10s.)—J. PEARMAN, Penny Long Lane, Derby.
 542 II. (7s. 6d.)—BROWN & SON, Flora Apiary, Somersham, Hunts.
 545 III. (5s.)—A. HISCOCK, Loddington, Kettering.
 540 R. N. & H. C.—R. H. BAYNES, 51 Bridge Street, Cambridge.

Class 532.—Exhibits of not less than 3 lb. of Wax, the Produce of the Exhibitor's Apiary. [2 entries, 1 absent.]

- 551 I. (10s.)—J. PEARMAN, Penny Long Lane, Derby.

Class 533.—Honey Vinegar. [2 entries.]

- 553 I. (7s. 6d.)—G. W. KIRBY, 17 Priory Road, Knowle, Bristol.
 552 II. (5s.)—BROWN & SON, Flora Apiary, Somersham, Hunts.

Class 534.—Mead. [1 entry.]

[No Award.]

Class 535.—Exhibit of a practical or interesting nature connected with Bee-culture, not mentioned in the foregoing Classes. [4 entries, 1 absent.]

- 555 I. (10s.)—W. DIXON, 27 Central Road, Kirkgate, Leeds.

Class 536.—Exhibit of a scientific nature, not mentioned in the foregoing Classes, to which no prize has been awarded at a Show of the R.A.S.E.

[1 entry.]

- 559 I. (10s.)—MISS A. BETTS, Hill House, Camberley.

BUTTER-MAKING COMPETITIONS.*Tuesday, July 2nd.* [14 competitors.]

- 12 I. (£5.)—MISS S. T. SLINGER, Oxtou Fallows, Southwell.
 10 II. (£3.)—MISS KATHLEEN SURR, Clayton, Doncaster.
 5 III. (£2.)—MISS EVA M. BAGGULEY, Moreton, Rolleston, Notts.
 9 IV. (£1.)—MISS PHEBE A. POPE, Blue Bell Farm, Blaxton, Doncaster.
 7 V. (10s.)—MISS ELIZA BROWN, Welham Villa, Retford.

Wednesday, July 3rd. [14 competitors.]

- 15 I. (£5.)—MISS LILIAN S. TURNER, Rockley Old Hall, Worsboro' Bridge, Barnsley.
 19 II. (£3.)—MISS MAY BARKER, Manor Farm, Bretton West, Wakefield.
 24 III. (£2.)—MISS DORA PYBUS, Pictou Manor, Yarm.
 16 IV. (£1.)—MISS WINIFRED G. WITHER, Coldhill, Aberford, Leeds.
 20 V. (10s.)—MISS ELIZABETH A. ROLLING, Primrose Hill Farm, Rufford, Ollerton.

Champion Class.—Thursday, July 4th. [10 competitors.]

- 5 I. (£5.)—MISS EVA M. BAGGULEY, Moreton, Rolleston, Notts.
 24 II. (£3.)—MISS DORA PYBUS, Pictou Manor, Yarm.
 12 III. (£2.)—MISS S. T. SLINGER, Oxtou Fallows, Southwell.
 9 IV. (£1.)—MISS PHEBE A. POPE, Blue Bell Farm, Blaxton, Doncaster.
 15 { Equal Fifth } MISS LILIAN S. TURNER, Rockley Old Hall, Worsboro' Bridge, Barnsley.
 19 { Prize of 10s. } MISS MAY BARKER, Manor Farm, Bretton West, Wakefield.

HORSE-SHOEING COMPETITIONS.**Class 1.—Hunters.** [25 competitors.]

- 18 I. (£5, & G. M.¹)—J. CHARLES MORRIS, A.F.C.L., R.S.S., Ledsam Street Shoeing Forge, Ladywood, Birmingham.
 19 II. (£3 10s., & S. M.²)—THOMAS NORTHWOOD, A.F.C.L., R.S.S., High Street Shoeing Forge, Cleobury Mortimer.
 5 III. (£2 10s., & B. M.²)—GEORGE DEIGHTON, R.S.S., 81 East Parade, Harrogate.
 12 IV. (£2.)—HARRY JONES, R.S.S., The Forge, Hendre, near Monmouth.

¹ Gold Medal given by the Worshipful Company of Farriers to the First Prize Winner in each Class.

² Silver and Bronze Medals given by the National Master Farriers' Association, in each Class, for Members of that Association only.

- 16 V. (£1 10s.)—HERBERT MORGAN, A.F.C.L., R.S.S., Cwmpwr, Llanarthney, Carmarthen.
 17 VI. (£1.)—THOMAS MORGAN, R.S.S., Cambrian Forge, Gowerton, Glam.
 24 R. N. & H. C.—ISAAC W. VALE, R.S.S., 212 Emscote Road, Warwick.

Class 2.—*Roadsters.* [43 competitors.]

- 55 I. (£5. & G. M.¹)—THOMAS NORTHWOOD, A.F.C.L., R.S.S., High Street Shoeing Forge, Cleobury Mortimer.
 45 II. (£3 10s., & S. M.²)—HARRY JONES, R.S.S., The Forge, Hendre, near Monmouth.
 53 III. (£2 10s., & B. M.²)—HERBERT MORGAN, A.F.C.L., R.S.S., Cwmpwr, Llanarthney, Carmarthen.
 32 IV. (£2.)—GEORGE DEIGHTON, R.S.S., 81 East Parade, Harrogate.
 37 V. (£1 10s.)—CHARLES S. DOUBLE, A.F.C.L., R.S.S., Holmleigh, Spencer's Wood, Reading.
 43 VI. (£1.)—ALLEN HOLLINGWORTH, R.S.S., 31 Eastgate, Honley, near Huddersfield.
 30 R. N. & H. C.—JAMES CREASER, A.F.C.L., R.S.S., Shoeing Forge, Ecclesfield, near Sheffield.

Class 3.—*Cart Horses.* [40 competitors.]

- 84 I. (£5. & G. M.¹)—EVAN EVANS, R.S.S., Rhyd-y-polon, Gorseinon, Glam.
 82 II. (£3 10s.)—TOM DRING, R.S.S., 180 Albemarle Street, Ashton-under-Lyne.
 88 III. (£2 10s., & S. M.²)—HARRY JONES, R.S.S., The Forge, Hendre, near Monmouth.
 105 IV. (£2.)—E. J. WHITEHORN, R.S.S., Globe Shoeing Forge, Tredegar, Mon.
 95 V. (£1 10s., & B. M.²)—HERBERT MORGAN, A.F.C.L., R.S.S., Cwmpwr, Llanarthney, Carmarthen.
 96 VI. (£1.)—THOMAS MORGAN, R.S.S., Cambrian Forge, Gowerton, Glam.
 81 R. N. & H. C.—EDWARD ERNEST DRING, A.F.C.L., R.S.S., Long Bennington, Grantham.

FARM PRIZE COMPETITIONS.³(Open to *bonâ fide* Tenant Farmers.)

For the best managed Farms in Yorkshire.

Class 1.—*Farms, chiefly Arable, of 200 acres or over, exclusive of Fell or Tidal Marsh Land* [17 entries.]

- 11 I. (£100.)—RICHARD MACHIN, Cattal Grange, Whixley, York.
 17 II. (£50.)—CHRISTOPHER D. WRIGHT, Nafferton Grange, Driffield.
 8 R. N.—TEASDALE H. HUTCHINSON, Manor House, Catterick.

Class 2.—*Farms, chiefly Arable, of not less than 50 and under 200 acres, exclusive of Fell or Tidal Marsh Land.* [9 entries.]

- 26 I. (£50.)—GEORGE WASS, Wombledon Grange, Nawton, R.S.O.
 18 II. (£25.)—CHARLES BEECH, Old Forest, Walshford, near Wetherby.
 23 R. N.—J. W. MERRYWEATHER, Woodfoot Farm, Whiston, Rotherham.

Class 3.—*Stock or Dairy Farms, of 200 acres or over, exclusive of Fell or Tidal Marsh Land.* [10 entries.]

- 27 I. (£100.)—H. ATKINSON, Yafforth Lodge, Northallerton.
 31 II. (£50.)—THOMAS & WILLIAM HUNTER, Cowside, Langcliffe, Settle.
 29 R. N. & H. C.—WILLIAM HINCHCLIFF, Belvedere, Thorne Road, Doncaster.

Class 4.—*Stock or Dairy Farms, of not less than 50 acres and under 200 acres, exclusive of Fell or Tidal Marsh Land.* [10 entries.]

- 38 I. (£50.)—ARTHUR GREEN, Low House Farm, Silsden, Keighley.
 39 II. (£25.)—THOMAS G. GREEN, Court Green Farm, Cloughton, R.S.O.

Class 5.—*Farms, chiefly Arable, of not less than 10 acres and under 50 acres.* [3 entries.]

- 48 I. (£20.)—JOHN BELL, Hagg Lane, Dunnington, York.
 47 II. (£10.)—W. H. ASQUITH, Wormsley Grove, Pontefract.
 49 III. (£5.)—ALFRED B. SMITH, Romanby House Farm, Northallerton.

¹ Gold Medal given by the Worshipful Company of Farriers to the First Prize Winner in each Class.

² Silver and Bronze Medals given by the National Master Farriers' Association, in each Class, for Members of that Association only.

³ Prizes given by the Doncaster Local Committee.

FORESTRY SECTION.

Class 1.—*Specimens of Oak, Elm, Ash, and Beech Timber.* [3 entries.]

3 I. (Silver Medal.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

2 II. (Bronze Medal.)—Rev. T. T. TAYLOR, Dodworth Grange, Barnsley.

Class 2.—*Specimens of Larch, Spruce, and Scotch Pine Timber.* [4 entries.]

5 I. (Silver Medal.)—THE EARL OF FEVERSHAM, Duncombe Park, Helmsley.

4 II. (Bronze Medal.)—THE EARL OF CARNARVON, Highclere Castle, Newbury.

Class 3.—*Specimens of any other sort of Hard Wood or Broad-leaved Timber.*
[1 entry.]

8 II. (Bronze Medal.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 4.—*Specimens of any other sort of Coniferous Timber.*

[No entry.]

Class 5.—*Oak Field Gates for Farm use.* [5 entries.]

12 I. (Silver Medal.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

10 II. (Bronze Medal.)—EARL FITZWILLIAM, Wentworth Woodhouse, Rotherham.

Class 6.—*Field Gates for Farm use, of any other Home-grown Wood.* [6 entries.]

18 I. (Silver Medal.)—SIR TATTON SYKES, BART, Sledmere, Malton.

14 II. (Bronze Medal.)—THE EARL OF CARNARVON, Highclere Castle, Newbury.

Class 7.—*Wicket or Hunting Gates.* [7 entries.]

25 (Silver Medal.)—SIR TATTON SYKES, BART., Sledmere.

Class 8.—*Tree Guards.* [3 entries.]

29 (Silver Medal.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 9.—*Fencing, of home-grown wood.* [7 entries.]

36-41 I. (Silver Medal.)—THE EARL OF YARBOROUGH, Brocklesby Park, Lincolnshire.

31-35 II. (Bronze Medal.)—EARL FITZWILLIAM, Wentworth Woodhouse, Rotherham.

Class 10.—*Fencing, of Foreign Timber.* [2 entries.]

42-51 (Silver Medal.)—ARMSTRONG, ADDISON & CO., Sunderland.

52-56 (Bronze Medal.)—ENGLISH BROTHERS, LTD., Wisbech, Cambs.

Class 11.—*Specimens showing comparative quality of any Timber grown on different soils and situations, and the respective ages at which it reaches marketable size and maturity.*

[No Entry.]

Class 12.—*Specimens of Stems, and Boards cut from them, illustrating the effects of dense and thin crops in branch suppression and quality of timber.*

[1 entry.]

57 (Silver Medal.)—THE EARL OF YARBOROUGH, Brocklesby Park, Lincolnshire.

Class 13.—*Nurserymen's Competition for the best exhibit of Specimen and Ornamental Trees.* [1 entry.]

58 (Silver Medal.)—DICKSONS, LTD., Chester.

Classes 14 to 21.—*Articles not for competition.*

Silver Medal.—PHILIP TATTON DAVIES COOKE, Owston, near Doncaster.

Silver Medal.—THE DUKE OF WELLINGTON, K.G., Strathfieldsaye, Mortimer.

Silver Medal.—THE DUKE OF NORTHUMBERLAND, K.G., Alnwick Castle.

Silver Medal.—FISHER, SON & SIBRAY, LTD., Royal Nurseries, Handsworth, Sheffield.

Bronze Medal.—GILBERT R. KEEN, 14 Ashton Street, Harehills, Leeds.

Bronze Medal.—KENT & BRYDON, Darlington.

Gold Medal given by the R.A.S.E. for the best general collection of exhibits in Classes 1-21 to the EARL OF YARBOROUGH, Brocklesby Park, Lincolnshire.

PLANTATIONS COMPETITION.

Restricted to Yorkshire.

SECTION I.

HARDWOODS as final crop. To be not less than 4 acres in extent. Restricted to estates of which more than 300 acres are woodlands.

Class 1, Stage A.—*Previous to the commencement of the first thinning, exclusive of the removal of dead and diseased trees.*

I. (Silver Medal.)—SIR TATTON SYKES, BART, Sledmere, Malton.

II. (Bronze Medal.)—F. J. O. MONTAGU, Ainsty, Wetherby.

Class 2, Stage B.—*From the end of Stage A up to the completion of the second thinnings.*

- I. (Silver Medal, and Gold Medal¹.)—LORD MIDDLETON, Birdsall, Malton.
 II. (Bronze Medal.)—THE EARL OF FEVERSHAM, Duncombe Park, Helmsley.

CONIFERS.—To be not less than 4 acres in extent. Restricted to estates of which *more* than 300 acres are woodlands.

Class 3, Stage A.—(*As above.*)

- I. (Silver Medal.)—THE EARL OF FEVERSHAM, Duncombe Park, Helmsley.
 II. (Bronze Medal.)—HECTOR CHRISTIE, Jervaulx Abbey, Middleham.

Class 4, Stage B.—(*As above.*)

- I. (Silver Medal.)—HECTOR CHRISTIE, Jervaulx Abbey, Middleham.
 II. (Bronze Medal.)—SIR TATTON SYKES, BART., Sledmere, Malton.

SECTION II.

HARDWOODS as final crop. To be not less than 2 acres in extent. Restricted to estates of which *less* than 300 acres are woodlands.

Class 5, Stage A.—(*As above.*)

[No entry.]

Class 6, Stage B.—(*As above.*)

- I. (Silver Medal.)—SIR ALEXANDER W. M. BOSVILLE MACDONALD OF THE ISLES, BART., Thorpe Hall, Bridlington.
 II. (Bronze Medal.)—RALPH CREYK, Rawcliffe Hall, Yorks.

CONIFERS.—Classes 7 and 8.

[No entry.]

Class 9.—*Best example showing systematic management of existing woodland area, including the renovation and conversion of an unprofitable wood into a profitable condition.*

- I. (Silver Medal.)—PHILIP TATTON DAVIES COOKE, Owston, near Doncaster.
 II. (Bronze Medal.)—HECTOR CHRISTIE, Jervaulx Abbey, Middleham.

Class 10.—*Plantations of not less than 2 acres, consisting of Douglas Fir, Sitka Spruce, Japanese Larch, Corsican Pine, or any other rarer Conifer, of not less than five or more than thirty years' growth.*

- I. (Silver Medal.)—HECTOR CHRISTIE, Jervaulx Abbey, Middleham.
 II. (Bronze Medal.)—THE EARL OF FEVERSHAM, Duncombe Park, Helmsley.

Class 11.—*Best managed woodland estates, not less than 1,000 acres in area.*

[No award.]

HOME NURSERIES COMPETITION.

Restricted to Yorkshire.

Class 1.—*Best Managed General Home Nurseries, not less than 1 acre in extent.*

- I. (Silver Medal.)—HECTOR CHRISTIE, Jervaulx Abbey, Middleham.
 II. (Bronze Medal.)—R. C. DE GREY VYNER, Newby Hall, Ripon.

Class 2.—*Best Managed General Home Nurseries, less than 1 acre in extent.*

- I. (Silver Medal.)—THE TRUSTEES OF THE DARLEY SETTLED ESTATES, Aldby Park, York.
 II. (Bronze Medal.)—F. J. O. MONTAGU, Ainsty, Wetherby.

Class 3.—*Best Managed Temporary Forest Nurseries.*

[No entry.]

¹ Gold Medal given by the Royal English Arboricultural Society for the best Plantation in Classes 1-11.

HORTICULTURAL EXHIBITION.

Class 1.—*Groups of Miscellaneous Plants, in and out of bloom.* [4 entries.]

- 1 I. (Large Gold Medal & £30.)—JAMES CYPHER & SONS, Queen's Road Nurseries Cheltenham.
- 2 II. (£25.)—W. A. HOLMES, West End Nurseries, Chesterfield.
- 4 III. (£20.)—JOE S. SHARP, Valley Nurseries, Bankfoot, Aldmondbury.
- 3 IV. (£15.)—WILLIAM VAUSE, Nurseryman, Leamington.

Class 2.—*Collections of Orchids.* [1 entry.]

- 5 I. (Gold Medal & £10.)—JAMES CYPHER & SONS, Queen's Road Nurseries, Cheltenham.

Class 3.—*Groups of Carnations, Flowers, and Plants combined.*
[No entry.]

Class 4.—*Groups of Tuberous Begonias in pots.* [3 entries.]

- 6 I. (Gold Medal & £10.)—BLACKMORE & LANGDON, Twerton Hill Nursery, Bath.
- 7 III. (£2.)—B. H. BROOKSBANK, Sandroek, Tickhill, Rotherham.

Class 5.—*Displays of Herbaceous Flowers, Bamboos, Lilioms, and Foliage.*
[6 entries.]

- 10 I. (£20.)—JAMES BACKHOUSE & SONS, The Nurseries, York.
- 9 II. (£15.)—WM. ARTINGDALE & SON, Nether Green Nursery, Sheffield.
- 11 III. (£10.)—W. & J. BROWN, 29 Narrow Street, Peterborough.
- 12 IV. (£5.)—GIBSON & CO., Nurserymen, Leeming Bar, Bedale.

Class 6.—*Collections of Store and Greenhouse Plants in bloom.* [1 entry.]

- 15 I. (Gold Medal & £10.)—JAMES CYPHER & SONS, Queen's Road Nurseries, Cheltenham.

Class 7.—*Collections of Cut Sprays of Carnations.* [1 entry.]

- 16 I. (Gold Medal & £5.)—C. ENGELMANN, Saffron Walden, Essex.

Class 8.—*Collections of Cut Hardy Perennials, Roses excluded.* [5 entries.]

- 20 I. (£10.)—HARKNESS & SONS, Bedale.
- 17 II. (£6.)—WM. ARTINGDALE & SON, Nether Green Nursery, Sheffield.

Class 9.—*Collections of Cut Roses.* [5 entries.]

- 26 I. (Gold Medal & £5.)—F. M. BRADLEY, Rose Grower, Peterborough.
- 24 II. (£3.)—W. & J. BROWN, Narrow Street, Peterborough.
- 23 III. (£2.)—R. W. PROCTOR & SONS, Ashgate Road, Chesterfield.

Class 10.—*Collections of Sweet Peas.* [6 entries.]

- 32 I. (Gold Medal & £5.)—E. W. KING & CO., Coggeshall, Essex.

Class 11.—*Collections of Eight Kinds of Vegetables.* [1 entry.]

- 33 I. (£5.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 12.—*Decorative Displays of Ripe Fruit.* [1 entry.]

- 34 I. (£15.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 13.—*Four bunches of Grapes, of distinct varieties.* [2 entries.]

- 36 I. (£3.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.
- 35 II. (£2.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Class 14.—*Two bunches of Muscat Grapes.* [1 entry.]

- 37 I. (30s.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 15.—*Two bunches of Black Hambro Grapes.* [2 entries.]

- 38 I. (30s.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 16.—*Two bunches of Madresfield Court Grapes.* [2 entries.]

- 40 I. (30s.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 17.—*Two dishes of peaches of distinct varieties.* [1 entry.]

- 42 I. (30s.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 18.—*Two dishes of Nectarines of distinct varieties.* [1 entry.]

- 43 I. (30s.)—THE DUKE OF PORTLAND, K.G., Welbeck, Worksop.

Class 19.—*Four dishes of Strawberries of distinct varieties.* [2 entries.]

- 44 I. (30s.)—CHARLES THELLUSSON, Brodsworth Hall, Doncaster.

Horticultural Exhibits not for Competition.

Large Gold Medals to:—

- 76 MESSRS. BAKERS, Nurserymen, Codsall, Staffordshire.
- 73 ROBERT BOLTON, Warton, Carnforth.
- 66 THE HON. VICARY GIBBS, Aldenham House, Elstree, Herts.
- 71 YOUNG & CO., Nurserymen, Hatherley, Cheltenham.

Gold Medals to:—

- 72 ALEX. DICKSON & SONS, Hawlmark, Newtownards.
- 60 A. F. DUTTON, The Nurseries, Iver, Bucks.
- 63 STUART LOW & CO., Bush Hill Park, Enfield.
- 55 H. B. MAY & SONS, Nurserymen, Upper Edmonton, London, N.
- 50 PENNELL & SONS, Lincoln.
- 57 CHARLES THELLUSSON, Brodsworth Hall, Doncaster.
- 70 JOHN WATERER & SONS, American Nurseries, Bagshot, Surrey.

Silver Gilt Medals to:—

- 51 R. H. BATH, LTD., Wisbech.
- 54 DICKSON & ROBINSON, Cathedral Street, Manchester.
- 52 KING'S ACRE NURSERIES, LTD., Hereford.
- 59 SUTTON & SONS, Reading.
- 65 KENT & BRYDON, Nurserymen, Darlington.
- 79 TOOGOOD & SONS, Seedsmen, Southampton.

Silver Medals to:—

- 81 E. J. BATCHELOR & SONS, Nurserymen, Harrogate.
- 77 BROADHEAD & SONS, Nurserymen, Thongsbridge, Huddersfield.
- 78 J. BURRELL & CO., Howe Hill Nurseries, Cambridge.
- 58 BENJAMIN R. CANT & SONS, Old Rose Gardens, Colchester.
- 82 MESSRS CLIBRANS, Nurserymen, Altrincham.
- 49 H. N. ELLISON, 5 & 7 Bull Street, West Bromwich.
- 47 GODFREY & SON, Nurserymen, Exmouth, Devon.
- 69 F. A. HAAGE, Erfurt, Germany.
- 67 MISS HEMUS, Holdfast Hall, Upton-on-Severn.
- 53 JARMAN & CO., Chard, Somerset.
- 56 GEORGE MASSEY & SONS, Seedsmen, Spalding.
- 48 HENRY MORSE, Westfield Nurseries, Eaton, Norwich.
- 61 SEAGRAVE & CO., Lane End Nurseries, Gleadless, Sheffield.
- 80 WM. SYDENHAM, Nurseryman, Melbourne, Derbyshire.
- 75 CHARLES WARNER, Abbey Nurseries, Leicester.
- 84 C. WATERS, Deanland Nursery, Balcombe, Sussex.

Certificates of Merit to:—

- 85 W. EDWARDS, Florist, Daybrook, Nottingham.
- 74 WHITELEGGE & PAGE, Nurseries, Chislehurst, Kent.

New Plants and Flowers for Certificates:—

- A. F. DUTTON, The Nurseries, Iver, Bucks.
- MISS HEMUS, Holdfast Hall, Upton-on-Severn.
- KENT & BRYDON, Nurserymen, Darlington.
- ALEX. DICKSON & SONS, LTD., Nurserymen, Hawlmark, Newtownards.
- BLACKMORE & LANGDON, Twerton Hill Nursery, Bath.

IMPLEMENTS.

Trials of Corn and Seed Drills.

Class 1.—*Drills for Corn and Pulse.* [8 entries.]

- 8 I. (£10.) & 7 II. (£5.)—FRANCIS WALKER & SONS, Tithby, Bingham, Notts.
- 3 H.C.—KELL & CO., LTD., Gloucester.

Class 2.—*Drills for Grass and Clover.* [1 entry.]

- 9 I. (£10.)—FRANCIS WALKER & SONS, Tithby, Bingham, Notts.

Miscellaneous Implements.

Silver Medal for articles entered as "New Implements for Agricultural or Estate Purposes."

- 830 TREWHELLA BROS., 6, Alma Street, Soho, Smethwick, Birmingham, for Winch Grubber for pulling out Trees or Stumps.
- 3481 ALFRED HOYLE, Don Foundry, Doncaster, for Dry Sprayer or Fungicide Distributor for Potatoes.

PRIZE LIST

For BRISTOL SHOW, JULY 1 to 5, 1913.

Total value of Prizes offered (inclusive of Champion Prizes, Special Prizes, Cups, Medals, and Class Prizes), 11,000*l.*, of which amount 1,985*l.* are contributions from the Bristol Local Committee, 2,449*l.* 15*s.* from various Breed Societies, and 712*l.* 10*s.* from other sources.

CHAMPION PRIZES.

The following Champion Prizes are offered by Breed Societies and others :—

HORSES.

SHIRE HORSE SOCIETY :—Two Gold Medals, value 10*l.* each (or 10*l.* in money), for the best Shire Stallion, and for the best Mare or Filly, and 5*l.* each to the Breeders of the Champion Shire Stallion, and Mare or Filly.

CLYDESDALE HORSE SOCIETY :—Two Prizes of 10*l.* each for the best Clydesdale Stallion, and for the best Mare or Filly.

SUFFOLK HORSE SOCIETY :—Challenge Cup, value 50*l.*, for the best Suffolk Stallion.

HUNTERS' IMPROVEMENT AND NATIONAL LIGHT HORSE BREEDING SOCIETY :—Two Gold Medals for the best Hunter Mare 4 years and upwards, and for the best Filly not exceeding 3 years old.

POLO AND RIDING PONY SOCIETY :—Two Gold Medals for the best Polo and Riding Pony Stallion or Colt, and for the best Mare or Filly ; also a Bronze Medal for the best Foal.

HACKNEY HORSE SOCIETY :—Two Gold Medals, value 10*l.* each (or 10*l.* in money), for the best Hackney Stallion, and for the best Mare or Filly.

SHETLAND PONY STUD BOOK SOCIETY :—Silver Medal for the best Shetland Pony

WELSH PONY AND COB SOCIETY :—Two Silver Medals and Certificates for the best Welsh Pony Stallion, and for the best Mare or Filly.

HUNTER RIDING CLASSES :—A Gold Challenge Cup, value 52*l.* 10*s.*, for the best Hunter Mare or Gelding in the Riding Classes.

HACK AND RIDING PONIES :—A Gold Challenge Cup, value 52*l.* 10*s.*, for the best Hack or Riding Pony.

HARNESS CLASSES :—A Gold Challenge Cup, value 52*l.* 10*s.*, for the best Single Harness Mare or Gelding in novice classes.

A Gold Challenge Cup, value 52*l.* 10*s.*, for the best Single Harness Mare or Gelding.

Two Gold Challenge Cups, value 52*l.* 10*s.* each, (i.) for the best Pair, (ii.) for the best Tandem.

FOUR-IN-HANDS :—A Gold Challenge Cup, value 52*l.* 10*s.*, for the best Team.

CATTLE.

SHORTHORN SOCIETY :—Two Prizes of 20*l.* each for the best Shorthorn Bull, and for the best Cow or Heifer.

DAIRY SHORTHORN (COATES'S HERD BOOK) ASSOCIATION :—Prize of 10*l.* for the best Pedigree Shorthorn Dairy Cow or Heifer ; and a Challenge Cup, value 52*l.* 10*s.*, for the best Pedigree Dairy Shorthorn Group of one Bull and two Cows or Heifers.

LINCOLNSHIRE RED SHORTHORN ASSOCIATION :—Two Prizes of 10*l.* each for the best Shorthorn Bull, and for the best Cow or Heifer.

HEREFORD HERD BOOK SOCIETY :—Two Prizes of 10*l.* 10*s.* each for the best Hereford Bull, and for the best Cow or Heifer.

DEVON CATTLE BREEDERS' SOCIETY :—Two Prizes of 10*l.* 10*s.* each for the best Devon Bull, and for the best Cow or Heifer.

SOUTH DEVONS :—A Challenge Cup, value 20*l.*, for the best South Devon animal.

LONGHORN CATTLE SOCIETY :—Two Challenge Cups, value 15*l.* each, for the best Longhorn animals.

SUSSEX HERD BOOK SOCIETY :—Two Silver Medals for the best Sussex Bull, and for the best Cow or Heifer.

RED POLL SOCIETY :—Two Prizes of 5*l.* each for the best Red Poll Bull, and for the best Cow or Heifer.

ABERDEEN ANGUS CATTLE SOCIETY :—A Gold Medal, value 10*l.*, for the best animal of the Aberdeen Angus breed.

ENGLISH ABERDEEN ANGUS CATTLE ASSOCIATION :—A Gold Medal for the best animal of the opposite sex to that of the animal awarded the Gold Medal of the Aberdeen Angus Cattle Society.

BRITISH HOLSTEIN CATTLE SOCIETY :—Silver Medals to the First Prize winners in the Classes for British Holstein Cattle.

ENGLISH JERSEY CATTLE SOCIETY :—Two Prizes of 5*l.* each for the best Jersey Bull, and for the best Cow or Heifer.

ENGLISH KERRY AND DEXTER CATTLE SOCIETY :—Two Challenge Cups, value 26*l.* 5*s.* each, for the best Kerry Bull, Cow, or Heifer, and for the best Dexter Bull, Cow, or Heifer.

ENGLISH JERSEY CATTLE SOCIETY :—Gold Medal (or 10*l.* in money), Silver Medal and Bronze Medal for the three best Jersey Animals in the Butter-test Classes.

SHEEP.

SOUTHDOWN SHEEP SOCIETY :—A Gold Medal (or 10*l.* 10*s.* in money) for the best Southdown Ram; and Silver Medal (or 1*l.* in money) for the best Pen of Ewes or Ewe Lambs.

HAMPSHIRE DOWN SHEEP BREEDERS' ASSOCIATION :—Prize of 10*l.* for the best Hampshire Down Ram Lamb, Pen of Ram Lambs, or Ewe Lambs.

CANADIAN INDUSTRIAL EXHIBITION :—Silver Medal for the best exhibit of Dorset Horn Sheep.

LINCOLN LONG-WOOL SHEEP BREEDERS' ASSOCIATION :—Prize of 5*l.*, for the best Lincoln Ram; a Challenge Cup, value 52*l.* 10*s.*, for the best Group of one Lincoln Ram and three Ewes.

SOCIETY OF BORDER LEICESTER SHEEP BREEDERS :—A Challenge Cup, value 50*l.*, for the best Border Leicester Sheep.

KENT OR ROMNEY MARSH SHEEP BREEDERS' ASSOCIATION :—Prize of 10*l.* 10*s.* for the best Kent or Romney Marsh Ram.

PIGS.

NATIONAL PIG BREEDERS' ASSOCIATION :—Six Gold Medals (or 5*l.* 5*s.* in money) for the best Large White Boar and Sow, Middle White Boar and Sow, and Tamworth Boar and Sow.

BRITISH BERKSHIRE SOCIETY :—Prize of 5*l.* 5*s.* for the best Berkshire Boar or Sow.

LARGE BLACK PIG SOCIETY :—Prize of 10*l.* for the best Large Black Boar; and a Challenge Cup, value twenty guineas, for the best Large Black Sow.

LINCOLNSHIRE CURLY-COATED PIG BREEDERS' ASSOCIATION :—Two Prizes of 5*l.* 5*s.* each, for the best Lincolnshire Curly-coated Boar and the best Sow.

HORSES (£3,591).

| | Prizes | | |
|---|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ |
| SHIRE. | | | |
| STALLION, foaled in 1912 ¹ . . . | 20 | 10 | 5 |
| STALLION, foaled in 1911 . . . | 20 | 10 | 5 |
| STALLION, foaled in 1910 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1912 ¹ . . . | 20 | 10 | 5 |
| FILLY, foaled in 1911 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1910 . . . | 20 | 10 | 5 |
| MARE, foaled in or after 1909 (with foal at foot) . . . | 20 | 10 | 5 |
| MARE, foaled in or before 1908 (with foal at foot) . . . | 20 | 10 | 5 |
| COLT FOAL, produce of mare in above classes. . . | 10 | 5 | 3 |
| FILLY FOAL, produce of mare in above classes. . . | 10 | 5 | 3 |

CLYDESDALE.²

| | | | |
|---|----|----|---|
| STALLION, foaled in 1912 . . . | 20 | 10 | 5 |
| STALLION, foaled in 1911 . . . | 20 | 10 | 5 |
| STALLION, foaled in 1910 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1912 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1911 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1910 . . . | 20 | 10 | 5 |
| MARE (with foal at foot) . . . | 20 | 10 | 5 |
| FOAL, produce of mare in above class . . . | 10 | 5 | 3 |

SUFFOLK.³

Same as for Clydesdales.

HUNTERS.⁴

| | | | |
|--|----|----|---|
| THOROUGHBRED COLT, foaled in 1912, entered or eligible for entry in the G.S.B. (likely to make a Hunter Stallion). . . | 20 | 10 | 5 |
| COLT OR GELDING, foaled in 1912 . . . | 20 | 10 | 5 |
| GELDING, foaled in 1911 . . . | 20 | 10 | 5 |
| GELDING, foaled in 1910 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1912 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1911 . . . | 20 | 10 | 5 |
| FILLY, foaled in 1910 . . . | 20 | 10 | 5 |
| THOROUGHBRED MARE, en- tered or eligible for entry in the G.S.B. (with foal at foot), up to weight . . . | 20 | 10 | 5 |
| <i>Two Prizes of £5 each are also offered in this class: (I.) for the best Colt Foal, and (II.) for the best Filly Foal.</i> | | | |
| MARE (Novice), foaled in or after 1905 (with foal at foot), up to from 12 to 14 st. . . | 20 | 10 | 5 |
| MARE (Novice), foaled in or after 1905 (with foal at foot), up to more than 14 st. . . | 20 | 10 | 5 |
| MARE (with foal at foot), up to from 12 to 14 st. . . | 20 | 10 | 5 |
| MARE (with foal at foot), up to more than 14 st. . . | 20 | 10 | 5 |
| COLT FOAL, produce of Mare in above classes . . . | 10 | 5 | 3 |
| FILLY FOAL, produce of Mare in above classes . . . | 10 | 5 | 3 |

POLO AND RIDING

PONIES.⁵

Prizes
1st 2nd 3rd
£ £ £

| | | | |
|---|----|----|---|
| STALLION, foaled in or before 1910, not over 15 h. . . | 15 | 10 | 5 |
| COLT, FILLY, OR GELDING, foaled in 1912 . . . | 15 | 10 | 5 |
| COLT, FILLY, OR GELDING, foaled in 1911 . . . | 15 | 10 | 5 |
| FILLY OR GELDING, foaled in 1910 . . . | 15 | 10 | 5 |
| MARE (with foal at foot), not over 14.2 h. . . | 15 | 10 | 5 |

CLEVELAND BAY OR
COACH HORSE.

| | | | |
|--|----|----|---|
| STALLION, foaled in 1910 or 1911 . . . | 15 | 10 | 5 |
| MARE (with foal at foot) . . . | 15 | 10 | 5 |

HACKNEYS.⁶

| | | | |
|--|----|----|---|
| STALLION, foaled in 1912 . . . | 15 | 10 | 5 |
| STALLION, foaled in 1911 . . . | 15 | 10 | 5 |
| STALLION, foaled in 1910 . . . | 15 | 10 | 5 |
| FILLY, foaled in 1912 . . . | 15 | 10 | 5 |
| FILLY, foaled in 1911 . . . | 15 | 10 | 5 |
| FILLY, foaled in 1910 . . . | 15 | 10 | 5 |
| MARE (with foal at foot), over 14. and not over 15.2 h. . . | 15 | 10 | 5 |
| MARE (with foal at foot), over 15.2 h. . . | 15 | 10 | 5 |
| FOAL, produce of Mare in above classes . . . | 10 | 5 | 3 |

HACKNEY PONY.

| | | | |
|--|----|---|---|
| STALLION, foaled in or before 1910, not over 14 h. . . | 10 | 5 | 3 |
| COLT, FILLY, OR GELDING, foaled in 1911, not over 13.2 h. . . | 10 | 5 | 3 |
| FILLY OR GELDING, foaled in 1910, not over 13.3 h. . . | 10 | 5 | 3 |
| MARE (with foal at foot), not over 14 h. . . | 10 | 5 | 3 |

SHETLAND PONY.

| | | | |
|--|----|---|---|
| STALLION, foaled in or before 1910, not over 10½ h. . . | 10 | 5 | 3 |
| MARE (with foal at foot), not over 10½ h. . . | 10 | 5 | 3 |

WELSH PONY.⁷

(Mountain or Moorland Class).

| | | | |
|---|----|---|---|
| STALLION, foaled in or before 1909, not exceeding 12 h. . . | 10 | 5 | 3 |
| STALLION, foaled in 1910, not exceeding 11.3 h. or 1911, not exceeding 11.2 h. . . | 10 | 5 | 3 |
| MARE, foaled in or before 1909 (with foal at foot), not ex- ceeding 12 h. . . | 10 | 5 | 3 |
| FILLY, foaled in 1910, not ex- ceeding 11.3 h. or 1911, not exceeding 11.2 h. . . | 10 | 5 | 3 |
| BROOD MARE, OR MARE likely to make a brood mare, of the old Welsh Cob type, foaled in or before 1910 (with or without foal at foot), not exceeding 14.2 h. . . | 10 | 5 | 3 |

¹ Offered by the Shire Horse Society.² £50 provided by the Clydesdale Horse Society.³ £50 provided by the Suffolk Horse Society.⁴ £100 and £80 provided by two members of the R.A.S.E. interested in the breed.⁵ £30 provided by the Polo and Riding Pony Society.⁶ £30 provided through the Hackney Horse Society.⁷ £42 provided by the Welsh Pony and Cob Society.

HUNTER RIDING
CLASSES.¹

| | Prizes | | | | |
|---|----------|----------|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ | 4th £ | 5th £ |
| MARE OR GELDING, foaled in 1909, up to from 12 to 14 st. | 15 | 10 | 5 | 5 | 5 |
| MARE OR GELDING, foaled in 1909, up to more than 14 st. | 15 | 10 | 5 | 5 | 5 |
| MARE OR GELDING (Novice), foaled in or before 1908, up to from 12 to 14 st. | 15 | 10 | 5 | 5 | 5 |
| MARE OR GELDING (Novice), foaled in or before 1908, up to more than 14 st. | 15 | 10 | 5 | 5 | 5 |
| MARE OR GELDING, foaled in or before 1909, up to from 12 to 13.7 st. | 20 | 15 | 10 | 5 | 5 |
| MARE OR GELDING, foaled in or before 1909, up to more than 13.7 and not over 15 st. | 20 | 15 | 10 | 5 | 5 |
| MARE OR GELDING, foaled in or before 1909, up to more than 15 st. | 20 | 15 | 10 | 5 | 5 |

HACK AND RIDING
PONY CLASSES.¹

| | Prizes | | |
|--|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ |
| MARE OR GELDING, Hunter or Polo Type (light-weight), foaled in or before 1909, not exceeding 15 h. | 15 | 10 | 5 |
| MARE OR GELDING, Hunter or Polo Type (heavy-weight), foaled in or before 1909, not exceeding 15 h. | 15 | 10 | 5 |
| MARE OR GELDING, Park Hack (light-weight), foaled in or before 1909, exceeding 15 h. | 15 | 10 | 5 |
| MARE OR GELDING, Park Hack (heavy-weight), foaled in or before 1909, exceeding 15 h. | 15 | 10 | 5 |

DRIVING CLASSES.¹

| | Prizes | | | |
|--|----------|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ | 4th £ |
| <i>To be driven in Single Harness.</i> | | | | |
| MARE OR GELDING (Novice), not over 14 h. | 15 | 10 | 5 | 5 |
| MARE OR GELDING (Novice), over 14 and not over 15 h. | 15 | 10 | 5 | 5 |
| MARE OR GELDING (Novice), over 15 h. | 15 | 10 | 5 | 5 |
| MARE OR GELDING, not over 14 h. | 15 | 10 | 5 | 5 |
| MARE OR GELDING, over 14 and not over 15 h. | 15 | 10 | 5 | 5 |
| MARE OR GELDING, over 15 and not over 15.2 h. | 15 | 10 | 5 | 5 |
| MARE OR GELDING over 15.2 h. | 15 | 10 | 5 | 5 |
| <i>To be driven in Double Harness.</i> | | | | |
| MARES OR GELDINGS, not over 15 h. | 15 | 10 | 5 | 5 |
| MARES OR GELDINGS, over 15 h. | 15 | 10 | 5 | 5 |

DRIVING CLASSES¹—
continued.

| | Prizes | | | |
|---|----------|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ | 4th £ |
| <i>To be driven Tandem.</i> | | | | |
| MARES OR GELDINGS, not over 15 h. | 15 | 10 | 5 | 5 |
| MARES OR GELDINGS, over 15 h. | 15 | 10 | 5 | 5 |
| <i>Four-in-hand Teams.</i> | | | | |
| MARES OR GELDINGS, to be shown before a Coach | 20 | 15 | 10 | 5 |

DRAUGHT HORSE.¹

| | Prizes. | | |
|--|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ |
| MARE OR GELDING, foaled in or after 1907 | 10 | 6 | 4 |

JUMPING
COMPETITIONS.¹

| | Prizes | | | | |
|--|----------|----------|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ | 4th £ | 5th £ |
| A MARE OR GELDING | 25 | 10 | 5 | 5 | 5 |
| B MARE OR GELDING (First Prize Winners in Class A not eligible) | 20 | 10 | 5 | 5 | 5 |
| C MARE OR GELDING, (First Prize Winners in Classes A and B not eligible) | 15 | 10 | 5 | 5 | 5 |
| D CHAMPION CLASS, Mare or Gelding | 25 | 15 | 10 | 5 | 5 |

CATTLE (£2,854 10s.).

SHORTHORN.

| | Prizes | | |
|---|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ |
| Cow, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1910 ² | 10 | 6 | 4 |
| HEIFER, calved on or between Jan. 1, 1911, and March 31, 1911 | 10 | 6 | 4 |
| HEIFER, calved on or between April 1, 1911, and Dec. 31, 1911 ² | 10 | 6 | 4 |
| HEIFER, calved on or between Jan. 1, 1912, and March 31, 1912 | 10 | 6 | 4 |
| HEIFER, calved on or between April 1, 1912, and Dec. 31, 1912 | 10 | 6 | 4 |
| GROUP CLASS, for the best collection of either three or four Cows or Heifers, bred by Exhibitor | 15 | 10 | — |
| BULL, calved in 1908, 1909, or 1910 | 10 | 6 | 4 |
| BULL, calved on or between Jan. 1, 1911, and March 31, 1911 | 10 | 6 | 4 |
| BULL, calved on or between April 1, 1911, and Dec. 31, 1911 ² | 10 | 6 | 4 |
| BULL, calved on or between Jan. 1, 1912, and March 31, 1912 | 10 | 6 | 4 |
| BULL, calved on or between April 1, 1912, and Dec. 31, 1912 ² | 10 | 6 | 4 |
| TWO SPECIAL PRIZES of 10 <i>l.</i> and 5 <i>l.</i> for the two best Bulls calved in 1911, the property of an Exhibitor residing in Gloucestershire ³ | | | |
| GROUP CLASS, for the best collection of either three or four Bulls, bred by Exhibitor ² | 15 | 10 | — |

¹ Provided by the Bristol Local Committee.² Offered by the Shorthorn Society.³ £5 offered by the Gloucestershire Agricultural Society,

| DAIRY SHORTHORN. | Prizes | | |
|---|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ |
| DAIRY COW, in-milk, calved in or before 1908 ¹ | 10 | 6 | 4 |
| DAIRY COW, in-milk, calved in 1909 | 10 | 6 | 4 |
| DAIRY HEIFER, in-milk, calved in or after 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 ² | 10 | 6 | 4 |
| BULL, calved in 1912 ² | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| LINCOLNSHIRE RED SHORTHORN. ³ | | | |
|---|----|---|---|
| COW, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| COW OR HEIFER, in-milk, calved in or before 1910, showing the best milking properties | 10 | 6 | 4 |
| BULL, calved in 1907, 1908, 1909, or 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 | 10 | 6 | 4 |
| BULL, calved in 1912 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| HEREFORD. ⁴ | | | |
|--|----|---|---|
| COW, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| BULL, calved in 1908, 1909, or 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 | 10 | 6 | 4 |
| BULL, calved in Jan. or Feb., 1912 | 10 | 6 | 4 |
| BULL, calved on or after March 1, 1912 | 10 | 6 | 4 |

| DEVON. ⁵ | | | |
|--|----|---|---|
| COW OR HEIFER, in-milk, calved in or before 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| DAIRY COW, in-milk, calved in or before 1910 | 10 | 6 | 4 |
| BULL, calved in or before 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 | 10 | 6 | 4 |
| BULL, calved in 1912 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| SOUTH DEVON. ⁶ | | | |
|--|----|---|---|
| COW OR HEIFER, in-milk, calved in or before 1910 | 10 | 6 | - |
| HEIFER, calved in 1911 | 10 | 6 | - |
| HEIFER, calved in 1912 | 10 | 6 | - |
| BULL, calved in or before 1911 | 10 | 6 | - |
| BULL, calved in 1912 | 10 | 6 | - |
| Milk Yield Prizes | 10 | 6 | 4 |

| LONGHORN. ⁷ | | | |
|--|----------|----------|----------|
| | 1st £ | 2nd £ | 3rd £ |
| COW OR HEIFER, in-milk, calved in or before 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 or 1912 | 10 | 6 | 4 |
| BULL, calved in 1908, 1909, 1910, or 1911 | 10 | 6 | 4 |
| BULL, calved in 1911 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| SUSSEX. | | | |
|--|----|---|---|
| COW OR HEIFER, in-milk, calved in or before 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| BULL, calved in 1908, 1909, or 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 ⁸ | 10 | 6 | 4 |
| BULL, calved in 1912 | 10 | 6 | 4 |

| WELSH. ⁹ | | | |
|--|----|---|---|
| COW OR HEIFER, in-milk, calved before Dec. 1, 1910 | 10 | 6 | 4 |
| HEIFER, calved on or after Dec. 1, 1910, and before Dec. 1, 1911 | 10 | 6 | 4 |
| HEIFER, calved on or after Dec. 1st, 1911, and before Dec. 1, 1912 | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1907, and before Dec. 1, 1910 | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1910, and before Dec. 1, 1911 | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1911, and before Dec. 1st, 1912 | 10 | 6 | 4 |

| RED POLL. ¹⁰ | | | |
|--|----|---|---|
| COW OR HEIFER, in-milk, calved in or before 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| BULL, calved in 1908, 1909, 1910, or 1911 | 10 | 6 | 4 |
| BULL, calved in 1912 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| ABERDEEN ANGUS. ¹¹ | | | |
|--|----|---|---|
| COW OR HEIFER, in-milk, calved before Dec. 1, 1910 | 10 | 6 | 4 |
| HEIFER, calved on or after Dec. 1, 1910, and before Dec. 1, 1911 | 10 | 6 | 4 |
| HEIFER, calved on or after Dec. 1, 1911, and before Dec. 1, 1912 | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1907, and before Dec. 1, 1910 | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1910, and before Dec. 1, 1911 | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1911, and before Dec. 1, 1912 | 10 | 6 | 4 |

¹ Offered by the Shorthorn Society.² Offered by the Dairy Shorthorn (Coates's Herd Book) Association.³ £80 provided by the Lincolnshire Red Shorthorn Association.⁴ £50 provided by the Hereford Herd Book Society.⁵ £50 provided by the Devon Cattle Breeders' Society.⁶ £20 provided by the South Devon Herd Book Society.⁷ £20 provided by the Longhorn Cattle Society.⁸ Offered by the Sussex Herd Book Society.⁹ £30 provided by the Welsh Black Cattle Society.¹⁰ £20 provided by the Red Poll Society.¹¹ £20 provided by the Aberdeen Angus Cattle Society

| | Prizes | | |
|---|--------|-----|-----|
| | 1st | 2nd | 3rd |
| GALLOWAY. ¹ | | | |
| £ | £ | £ | £ |
| COW OR HEIFER, in-milk, calved before Dec. 1, 1910 | 10 | 6 | 4 |
| HEIFER, calved on or after Dec. 1, 1910, and before Dec. 1, 1911. | 10 | 6 | 4 |
| HEIFER, calved on or after Dec. 1, 1911, and before Dec. 1, 1912. | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1907, and before Dec. 1, 1912. | 10 | 6 | 4 |
| BULL, calved on or after Dec. 1, 1911, and before Dec. 1, 1912. | 10 | 6 | 4 |

| HIGHLAND. | | | |
|---------------------------------|----|---|---|
| £ | £ | £ | £ |
| COW OR HEIFER, in-milk | 10 | 6 | 4 |
| BULL, calved in or before 1912. | 10 | 6 | 4 |

| AYRSHIRE. ² | | | |
|---------------------------------|----|---|---|
| £ | £ | £ | £ |
| COW OR HEIFER, in-milk. | 10 | 6 | 4 |
| COW OR HEIFER, in-calf. | 10 | 6 | 4 |
| BULL, calved in or before 1912. | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| BRITISH HOLSTEIN. ³ | | | |
|---|----|---|---|
| £ | £ | £ | £ |
| Cow, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1910 or 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| BULL, calved in or before 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 or 1912 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| JERSEY. ⁴ | | | |
|--|----|---|---|
| £ | £ | £ | £ |
| Cow, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1910 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912. | 10 | 6 | 4 |
| COW OR HEIFER, in-milk, bred by Exhibitor, sired in Great Britain or Ireland | 10 | 6 | 4 |
| BULL, calved 1908, 1909, or 1910 | 10 | 6 | 4 |
| BULL, calved in 1911 | 10 | 6 | 4 |
| BULL, calved in 1912 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| GUERNSEY. ⁵ | | | |
|---|----|---|---|
| £ | £ | £ | £ |
| Cow, in-milk, calved in or before 1908 | 10 | 6 | 4 |
| COW OR HEIFER, in-milk, calved in 1909 or 1910. | 10 | 6 | 4 |
| HEIFER, calved in 1911 | 10 | 6 | 4 |
| HEIFER, calved in 1912 | 10 | 6 | 4 |
| BULL, calved in 1908, 1909, 1910, or 1911 | 10 | 6 | 4 |
| BULL, calved in 1912 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

| KERRY. ⁶ | | | |
|---|----|---|---|
| £ | £ | £ | £ |
| Cow, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| HEIFER, in-milk, calved in 1910 | 10 | 6 | 4 |
| HEIFER, calved in 1911 or 1912 | 10 | 6 | 4 |
| BULL, calved in 1908, 1909, 1910, or 1911 | 10 | 6 | 4 |
| Milk Yield Prizes | 10 | 6 | 4 |

DEXTER.⁶

Same as for Kerries.

| DAIRY CATTLE. ⁷ | | | |
|--|----|---|---|
| (Any Age, Breed, or Cross.) | | | |
| £ | £ | £ | £ |
| DAIRY COW, in-milk, calved in or before 1909 | 10 | 6 | 4 |
| DAIRY COW, in-milk, calved in or after 1910 | 10 | 6 | 4 |

| BUTTER TESTS. ⁸ | | | |
|---|----|----|---|
| £ | £ | £ | £ |
| Cow, exceeding 900 lb. live weight. | 15 | 10 | 5 |
| Cow, not exceeding 900 lb. live weight. | 15 | 10 | 5 |

SHEEP (£1,836 10s.).

| OXFORD DOWN. | | | |
|-------------------------|----|---|---|
| £ | £ | £ | £ |
| SHEARLING RAM. | 10 | 5 | 3 |
| RAM LAMB ⁹ . | 10 | 5 | 3 |
| THREE RAM LAMBS. | 10 | 5 | 3 |
| THREE SHEARLING EWES. | 10 | 5 | 3 |
| THREE EWE LAMBS. | 10 | 5 | 3 |

| SHROPSHIRE. ¹⁰ | | | |
|---------------------------|----|----|---|
| £ | £ | £ | £ |
| TWO-SHEAR RAM | 10 | 5 | 3 |
| SHEARLING RAM | 10 | 5 | 3 |
| FIVE SHEARLING RAMS | 15 | 10 | 5 |
| THREE RAM LAMBS | 10 | 5 | 3 |
| THREE SHEARLING EWES | 10 | 5 | 3 |
| THREE EWE LAMBS | 10 | 5 | 3 |

| SOUTHDOWN. | | | |
|------------------------------------|----|---|---|
| £ | £ | £ | £ |
| TWO-SHEAR RAM ¹¹ | 10 | 5 | 3 |
| SHEARLING RAM | 10 | 5 | 3 |
| THREE SHEARLING RAMS ¹¹ | 10 | 5 | 3 |
| THREE RAM LAMBS | 10 | 5 | 3 |
| THREE SHEARLING EWES | 10 | 5 | 3 |
| THREE EWE LAMBS | 10 | 5 | 3 |

| HAMPSHIRE DOWN. | | | | |
|---------------------------------------|----|---|---|---|
| £ | £ | £ | £ | £ |
| TWO-SHEAR RAM ¹² | 10 | 5 | - | - |
| SHEARLING RAM | 10 | 5 | 3 | - |
| RAM LAMB ¹² | 10 | 5 | 3 | 2 |
| THREE RAM LAMBS | 10 | 5 | 3 | - |
| THREE RAM LAMBS, Novice ¹² | 10 | 5 | 3 | 2 |
| THREE SHEARLING EWES | 10 | 5 | 3 | - |
| THREE EWE LAMBS | 10 | 5 | 3 | - |
| THREE EWE LAMBS, Novice ¹² | 10 | 5 | 3 | 2 |

| SUFFOLK. | | | |
|-----------------------------|----|---|---|
| £ | £ | £ | £ |
| TWO-SHEAR RAM ¹³ | 10 | 5 | 3 |
| SHEARLING RAM | 10 | 5 | 3 |
| RAM LAMB ¹³ | 10 | 5 | 3 |
| THREE RAM LAMBS | 10 | 5 | 3 |
| THREE SHEARLING EWES | 10 | 5 | 3 |
| THREE EWE LAMBS | 10 | 5 | 3 |

¹ £20 provided by the Galloway Cattle Society.

² £20 provided by the Ayrshire Cattle Herd Book Society.

³ £30 provided by the British Holstein Cattle Society.

⁴ £30 provided by the English Jersey Cattle Society.

⁵ £40 provided by the English Guernsey Cattle Society.

⁶ £30 provided by the English Kerry and Dexter Cattle Society.

⁷ Offered by the Bristol Local Committee.

⁸ Offered by the English Jersey Cattle Society.

⁹ Offered by the Oxford Down Sheep Breeders' Association.

¹⁰ £45 provided by the Shropshire Sheep Breeders' Association.

¹¹ Offered by the Southdown Sheep Society.

¹² Offered by the Hampshire Down Sheep Breeders' Association.

¹³ Offered by the Suffolk Sheep Society.

| | Prizes | | |
|---------------------------------|--------|-----|-----|
| | 1st | 2nd | 3rd |
| DORSET DOWN.¹ | | | |
| SHEARLING RAM . . . | 10 | 5 | - |
| THREE RAM LAMBS . . . | 10 | 5 | - |
| THREE SHEARLING EWES . . . | 10 | 5 | - |

| | | | |
|--|----|---|---|
| DORSET HORN.² | | | |
| SHEARLING RAM, dropped after Nov. 1, 1910 . . . | 10 | 5 | 3 |
| THREE RAM LAMBS, dropped after Nov. 1, 1911 . . . | 10 | 5 | 3 |
| THREE SHEARLING EWES, dropped after Nov. 1, 1910 . . . | 10 | 5 | 3 |
| THREE EWE LAMBS, dropped after Nov. 1, 1911 . . . | 10 | 5 | 3 |

| | | | |
|----------------------------------|----|---|---|
| RYELAND.³ | | | |
| RAM, TWO-SHEAR and upwards . . . | 10 | 5 | 3 |
| SHEARLING RAM . . . | 10 | 5 | 3 |
| THREE RAM LAMBS . . . | 10 | 5 | 3 |
| THREE SHEARLING EWES . . . | 10 | 5 | 3 |

| | | | |
|----------------------------------|----|---|---|
| KERRY HILL (WALES). | | | |
| RAM, SHEARLING and upwards . . . | 10 | - | - |
| THREE SHEARLING EWES . . . | 10 | - | - |

| | | | |
|--|----|----|---|
| LINCOLN.⁴ | | | |
| TWO-SHEAR RAM . . . | 10 | 5 | 3 |
| SHEARLING RAM . . . | 10 | 5 | 3 |
| FIVE SHEARLING RAMS . . . | 15 | 10 | 5 |
| THREE RAM LAMBS . . . | 10 | 5 | 3 |
| THREE SHEARLING EWES . . . | 10 | 5 | 3 |
| THREE EWE LAMBS . . . | 10 | 5 | 3 |
| THREE YEARLING EWES, shown in their wool . . . | 10 | 5 | 3 |

| | | | |
|-------------------------------|----|---|---|
| LEICESTER.⁵ | | | |
| SHEARLING RAM . . . | 10 | 5 | - |
| THREE RAM LAMBS . . . | 10 | 5 | - |
| THREE SHEARLING EWES . . . | 10 | 5 | - |
| THREE EWE LAMBS . . . | 10 | 5 | - |

| | | | |
|--------------------------------------|----|---|---|
| BORDER LEICESTER.⁶ | | | |
| RAM, TWO SHEAR and upwards . . . | 10 | 5 | 3 |
| SHEARLING RAM . . . | 10 | 5 | 3 |
| SHEARLING EWE . . . | 10 | 5 | 3 |

| | | | |
|--|----|---|---|
| WENSLEYDALE.⁷ | | | |
| RAM, TWO-SHEAR and upwards, entered or eligible for entry in the Wensleydale Blue-faced Flock Book . . . | 10 | 5 | 3 |
| SHEARLING RAM . . . | 10 | 5 | 3 |
| THREE SHEARLING RAMS, entered or eligible for entry in the Wensleydale Blue-faced Flock Book . . . | 10 | 5 | 3 |
| THREE SHEARLING EWES . . . | 10 | 5 | 3 |

| | | | |
|----------------------------------|----|---|---|
| LONK.⁸ | | | |
| RAM, SHEARLING and upwards . . . | 10 | 5 | - |
| THREE SHEARLING EWES . . . | 10 | 5 | - |

DERBYSHIRE GRITSTONE.

Same as for Kerry Hill.

KENT OR ROMNEY MARSH.⁹

Same as for Shropshire.

COTSWOLD.¹⁰

| | | | |
|----------------------------|----|---|---|
| SHEARLING RAM . . . | 10 | 5 | 3 |
| THREE RAM LAMBS . . . | 10 | 5 | 3 |
| THREE SHEARLING EWES . . . | 10 | 5 | 3 |
| THREE EWE LAMBS . . . | 10 | 5 | 3 |

DEVON LONG-WOOL.¹¹

| | | | |
|----------------------------------|----|---|---|
| RAM, TWO-SHEAR and upwards . . . | 10 | 5 | - |
| SHEARLING RAM . . . | 10 | 5 | - |
| THREE SHEARLING EWES . . . | 10 | 5 | - |

SOUTH DEVON.¹²

| | | | |
|----------------------------|----|---|---|
| TWO-SHEAR RAM . . . | 10 | 5 | - |
| SHEARLING RAM . . . | 10 | 5 | - |
| THREE RAM LAMBS . . . | 10 | 5 | - |
| THREE SHEARLING EWES . . . | 10 | 5 | - |
| THREE EWE LAMBS . . . | 10 | 5 | - |

DARTMOOR.¹³

Same as for Devon Long Wool.

EXMOOR.¹⁴

| | | | |
|----------------------------------|----|---|---|
| RAM, TWO SHEAR and upwards . . . | 10 | 5 | 3 |
| SHEARLING RAM . . . | 10 | 5 | 3 |
| THREE SHEARLING EWES . . . | 10 | 5 | 3 |

CHEVIOT.¹⁵

Same as for Border Leicesters.

HERDWICK.

Same as for Kerry Hill.

WELSH MOUNTAIN.

Same as for Kerry Hill.

BLACK-FACED MOUNTAIN.

| | | | |
|----------------------------------|----|---|---|
| RAM, SHEARLING and upwards . . . | 10 | - | - |
| SHEARLING EWE . . . | 10 | - | - |

¹ £15 provided by the Dorset Down Sheep Breeders' Association.² £18 provided by the Dorset Horn Sheep Breeders' Association.³ £24 provided by the Ryeland Flock Book Society.⁴ £66 provided by the Lincoln Long-Wool Sheep Breeders' Association.⁵ £15 provided by the Leicester Sheep Breeders' Association.⁶ £18 provided by the Society of Border Leicester Sheep Breeders.⁷ £18 provided by the Wensleydale Blue-faced Sheep Breeders' Association.⁸ £5 provided by the Lonk Sheep Breeders' Association.⁹ £48 provided by the Kent or Romney Marsh Sheep Breeders' Association.¹⁰ £18 provided by the Cotswold Sheep Society.¹¹ £15 provided by the Devon Long-Woolled Sheep Breeders' Society.¹² £30 provided by the South Devon Flock Book Association.¹³ £15 provided by the Dartmoor Sheep Breeders' Association.¹⁴ £18 provided by the Exmoor Horn Sheep Breeders' Society.¹⁵ £18 provided by Breeders of Cheviot Sheep.

PIGS (£762 5s.).

| | | | | | | |
|--|---|---|---|---|---|----------------------------|
| Large White ¹ | . | . | . | . | . | } For Prizes see below. |
| Middle White ¹ | . | . | . | . | . | |
| Tamworth ¹ | . | . | . | . | . | |
| Berkshire ² | . | . | . | . | . | |
| Large Black ³ | . | . | . | . | . | |
| Lincolnshire Curly-Coated ⁴ | . | . | . | . | . | |

In each of the above Breeds the following prizes will be given:—

| | 1st | 2nd | 3rd |
|---|------|-----|-----|
| BOAR, farrowed in 1909, 1910, or 1911 | £ 10 | £ 5 | £ 3 |
| BOAR, farrowed in 1912 | 10 | 5 | 3 |
| BOAR, farrowed in 1913 | 10 | 5 | 3 |
| BREEDING SOW, farrowed in 1909, 1910, or 1911 | 10 | 5 | 3 |
| SOW, farrowed in 1912 | 10 | 5 | 3 |
| THREE SOW PIGS, farrowed in 1913 | 10 | 5 | 3 |

POULTRY (£432).

Prizes of 30s., 20s., and 10s. are offered in each class for the best COCK, HEN, COCKEREL, and PULLET of the following Breeds:—

Game, Old English.
Game, Indian.
Game, Modern.
Game, Black Sumatra.
Langshan.
Croad Langshan.

A SPECIAL PRIZE of 1*l*. for the best Croad Langshan.⁵

Plymouth Rock, White.

A SILVER SERVIETTE RING for the best White Plymouth Rock.⁶

Plymouth Rock, Barred.

A SILVER SERVIETTE RING for the Best Barred Plymouth Rock.⁷

Plymouth Rock, Buff.

A SILVER SERVIETTE RING for the best Buff Plymouth Rock.⁸

Plymouth Rock, Blue.

Plymouth Rock, any other colour.

Wyandotte, Gold or Silver Laced.

Wyandotte, White.

A SPECIAL PRIZE of 10s. for the best White Wyandotte.⁹

Wyandotte, Black.

Wyandotte, Partridge.

Wyandotte, Columbian.

Wyandotte, Blue.

Wyandotte, any other variety.

Orpington, Buff.

Orpington, White.

Orpington, Black.

POULTRY—continued.

Orpington, Spangled.
Orpington, Blue.
Orpington, any other colour.
Minorca.
Leghorn, White.
Leghorn, Brown.
Leghorn, Black.
Leghorn, any other colour.
Dorking.
Sussex, Red.
Sussex, Light.
Sussex, Speckled.

THREE SERVIETTE RINGS: (1) for best Red, (2) for best Light, (3) for best Speckled Sussex.¹⁰

British Rhode Island Red.

Ancona.

Yokohama.

Brahma.

Cochin.

Maline.

TWO SILVER MEDALS: (1) for best Coucou de Maline, (2) for any other variety of Maline.¹¹

Campine.

SILVER MEDAL for best Campine.¹²

Faverolle.

Houdan.

Any other Breed.

Bantams, Old English Game.

Bantams, Modern Game.

Bantams, Sebright.

Bantams, Wyandotte.

Bantams, Japanese.

Bantams, any other variety.

DUCKS.

DRAKE OR YOUNG DRAKE,
DUCK OR DUCKLING.

Aylesbury.

Rouen.

Blue Orpington.

Buff Orpington.

A SPECIAL PRIZE of 1*l*, 1s. for the best Buff Orpington.¹³

Any other breed.

GEESE.

GANDER AND GOOSE.

Any variety.

TURKEYS.

Cock.

Hen.

¹ £72 provided by the National Pig Breeders' Association.

² £18 provided by the British Berkshire Society.

³ £18 provided by the Large Black Pig Society.

⁴ £18 provided by the Lincolnshire Curly-Coated Pig Breeders' Association.

⁵ Offered by the Croad Langshan Club.

⁶ Offered by the White Plymouth Rock Club.

⁷ Offered by the Barred Plymouth Rock Club.

⁸ Offered by the Buff Plymouth Rock Club.

⁹ Offered by the White Wyandotte Club.

¹⁰ Offered by the Sussex Poultry Club.

¹¹ Offered by the Malines Poultry Club.

¹² Offered by the Campine Club.

¹³ Offered by the Orpington Duck Club.

PRODUCE (£316).

BUTTER.

Box of Twelve 2 lb. Rolls or Squares of BUTTER, not more than 1 per cent. salt.
1st 4l., 2nd 2l., 3rd 1l.

| | Prizes | | |
|---|--------|-----|-----|
| | 1st | 2nd | 3rd |
| TWO POUNDS OF FRESH BUTTER, without any salt, made up in plain pounds, from the milk of Channel Island, Devon, or South Devon Cattle and their crosses | 4 | 2 | 1 |
| TWO POUNDS OF FRESH BUTTER, without any salt, made up in plain pounds, from the milk of Cattle of any breed or cross other than those mentioned | 4 | 2 | 1 |
| TWO POUNDS OF FRESH BUTTER, slightly salted, made up in plain pounds, from the milk of Channel Island, Devon, or South Devon Cattle and their crosses | 4 | 2 | 1 |
| TWO POUNDS OF FRESH BUTTER, slightly salted, made up in plain pounds, from the milk of Cattle of any breed or cross other than those mentioned | 4 | 2 | 1 |
| TWO POUNDS OF BUTTER, made from scalded cream | 4 | 2 | 1 |
| THREE POUNDS OF FRESH BUTTER, slightly salted, made up in pounds in the most attractive marketable designs. The designs as well as the quality will be taken into account by the Judge | 4 | 2 | 1 |
| THREE POUNDS OF FRESH BUTTER, slightly salted, made up in pounds and packed in non-returnable boxes for transmission by rail or parcel post. The packing, the box, and the quality will be taken into account by the Judge who will open the exhibits | 4 | 2 | 1 |

CHEESE (made in 1913).

| | £ | £ | £ |
|---|---|---|---|
| THREE CHEDDAR, not less than 50 lb. each | 5 | 3 | 2 |
| THREE CHEDDAR TRUCKLES | 4 | 2 | 1 |
| THREE CHESHIRE (coloured), of not less than 40 lb. each | 5 | 3 | 2 |
| THREE CHESHIRE (uncoloured), of not less than 40 lb. each | 5 | 3 | 2 |
| THREE DOUBLE GLOUCESTER, not less than 22 lb. each | 5 | 3 | 2 |
| THREE SINGLE GLOUCESTER, not less than 13 lb. each | 4 | 2 | 1 |
| THREE NORTH WILTSHIRE TRUCKLES | 4 | 2 | 1 |
| THREE STILTON | 4 | 2 | 1 |
| THREE WENSLEYDALE (Stilton shape) | 3 | 2 | 1 |
| THREE CAERPHILLY | 4 | 2 | 1 |

CIDER AND PERRY. Prizes
1st 2nd 3rd
£ £ £

| | | | |
|---|---|---|---|
| Cask of DRY CIDER, made in 1912 | 4 | 2 | 1 |
| Cask of SWEET CIDER, made in 1912 | 4 | 2 | 1 |
| Cask of CIDER, made previous to 1912 | 4 | 2 | 1 |
| ONE DOZ. DRY CIDER, made in 1912 | 4 | 2 | 1 |
| ONE DOZ. SWEET CIDER, made in 1912 | 4 | 2 | 1 |
| ONE DOZ. CIDER, made previous to 1912 | 4 | 2 | 1 |
| ONE DOZ. DRY PERRY | 4 | 2 | 1 |
| ONE DOZ. SWEET PERRY | 4 | 2 | 1 |

A CHALLENGE CUP for the best exhibit of Cider.¹

WOOL (of 1913 Clip).

| | | | |
|---|---|---|---|
| THREE FLEECES, SOUTHDOWN ² | 3 | 2 | 1 |
| THREE FLEECES, OXFORD DOWN ³ | 3 | 2 | 1 |
| THREE FLEECES, SUFFOLK ⁴ | 3 | 2 | 1 |
| THREE FLEECES, any SHORT WOOL | 5 | 3 | 2 |
| THREE FLEECES, KENT OR ROMNEY MARSH ⁵ | 3 | 2 | 1 |
| THREE FLEECES, WENSLEYDALE BLUE-FACED ⁶ | 3 | 2 | 1 |
| THREE FLEECES, any LONG WOOL | 5 | 3 | 2 |
| THREE FLEECES, EXMOOR ⁷ | 3 | 2 | 1 |
| THREE FLEECES, MOUNTAIN or MOORLAND (comprising Dartmoor, Exmoor, Herdwick, Welsh and Black-faced Mountain) | 5 | 3 | 2 |

HIVES, HONEY, AND BEE APPLIANCES. s. s. s.

| | | | |
|---|-----|----|----|
| Collection of HIVES | .80 | 40 | 20 |
| FRAME HIVE | .20 | 15 | 10 |
| Do. for Cottagers' use | .20 | 15 | 10 |
| HONEY EXTRACTOR | .15 | 10 | - |
| OBSERVATORY HIVE (not less than 3 frames) | .20 | 15 | 10 |
| USEFUL APPLIANCES | .10 | - | - |

HONEY—(Local Classes).

Open to members of Somersetshire Bee Keepers' Association only.

| | s. | s. | |
|--|----|-----|-----------------|
| 4 Sections of COMB HONEY, about 4 lb. | 10 | 7/6 | Cert. of Merit. |
| EXTRACTED, LIGHT-COLOURED HONEY about 4 lb. | 10 | 7/6 | Cert. of Merit. |
| Collective Exhibit of COMB HONEY; EXTRACTED, LIGHT-COLOURED, MEDIUM OR DARK-COLOURED HONEY; and 1 lb. of WAX | 20 | 10 | Cert. of Merit. |

¹ Offered by the Cider Growers of the West of England.

² Offered by the Southdown Sheep Society.

³ Offered by the Oxford Down Sheep Breeders' Association.

⁴ Offered by the Suffolk Sheep Society.

⁵ Offered by the Kent or Romney Marsh Sheep Breeders' Association.

⁶ Offered by the Wensleydale Blue-faced Sheep Breeders' Association and Flock Book Society.

⁷ Offered by the Exmoor Horn Sheep Breeders' Association.

HONEY—(Open Competition).

For the purposes of Classes for Honey the United Kingdom has been divided into Two Districts:—

1. Counties of Cheshire, Cumberland, Derby, Durham, Hereford, Lancashire, Leicester, Lincoln, Monmouth, Northumberland, Nottingham, Rutland, Salop, Stafford, Warwick, Westmorland, Worcester, Yorkshire, the Isle of Man, Ireland, Scotland, or Wales.

2. Counties of Bedford, Berks., Bucks., Cambridge, Cornwall, Devon, Dorset, Essex, Gloucester, Hampshire, Herts., Hunts., Isle of Wight, Kent, Middlesex, Norfolk, Northampton, Oxford, Somerset, Suffolk, Surrey, Sussex, or Wiltshire.

For each of the above Districts the following four Classes and Prizes, for Honey of any year, have been provided:—

| | Prizes | | |
|---|--------|-----|-----|
| | 1st | 2nd | 3rd |
| 12 Sections of COMB HONEY, about 12 lb. | 20 | 15 | 10 |
| EXTRACTED, LIGHT-COLOURED HONEY, about 12 lb. | 20 | 15 | 10 |
| EXTRACTED, MEDIUM OR DARK-COLOURED HONEY, about 12 lb. | 20 | 15 | 10 |
| GRANULATED HONEY, about 12 lb. | 20 | 15 | 10 |
| MISCELLANEOUS. | | | |
| Shallow frames of COMB HONEY, for extracting | 20 | 15 | 10 |
| Jars of HEATHER HONEY, about 6 lb. | 20 | 15 | 10 |
| Jars of HEATHER MIXTURE EXTRACTED HONEY, about 6 lb. | 20 | 15 | 10 |
| DISPLAY OF HONEY | 30 | 20 | 10 |
| 2 lb. of WAX | 10 | 7/6 | 5 |
| 3 lb. of WAX, in marketable form, suitable for retail trade | 10 | 7/6 | 5 |
| HONEY VINEGAR, 1 quart | 7/6 | 5 | - |
| MEAD, 1 quart | 7/6 | 5 | - |
| OTHER PRACTICAL EXHIBITS. 10 | 10 | - | - |
| OTHER SCIENTIFIC EXHIBITS. 10 | 10 | - | - |

HORSE-SHOEING COMPETITIONS (£81).

(Open to the United Kingdom.)

CLASS I. Hunters. CLASS II. Roadsters. CLASS III. Cart Horses.

Prizes in each Class as follows:—1st, 5*l.*; 2nd, 3*l.* 10*s.*; 3rd, 2*l.* 10*s.*; 4th, 2*l.*; 5th, 1*l.* 10*s.*; 6th, 1*l.*

A Gold Medal will be presented to the First Prize Winner in each Class.¹

A Silver Medal and a Bronze Medal in each Class to be competed for by Members of the National Master Farriers' Association.²

BUTTER-MAKING COMPETITIONS (£84 10*s.*).

The Competitions on Tuesday, Wednesday and Thursday will be open only to those resident in the Counties of Somerset, Dorset, Devon, Gloucester, Wiltshire, Cornwall, Worcester, Hereford, Monmouth, Glamorgan, who have been pupils or received instruction in Dairying at their respective County Council Institutes or Dairy Schools since the 1st day of January, 1910, and who have not previous to the 31st of May, 1913, won a Prize in an open class at the Shows of the R.A.S.E., Bath and West and Southern Counties Society, Royal Counties Society, or at the London Dairy Show.

The Competition on Saturday will be open to competitors resident in the United Kingdom.

The following Prizes are offered on Tuesday, Wednesday and Thursday:—1st Prize, 5*l.*; 2nd Prize, 3*l.*; 3rd Prize, 2*l.*; 4th Prize, 1*l.*; 5th Prize, 10*s.* Certificates of Merit will be given to those candidates obtaining 86 points out of a possible 100.

On Saturday a Champion Prize of 10*l.* will be offered.

Special Prizes of 4*l.*, 3*l.*, 2*l.*, and 1*l.* for candidates resident in the County of Devon.³

Special Prizes of 4*l.*, 3*l.*, 2*l.*, and 1*l.* for candidates resident in the County of Gloucester.⁴

Special Prizes of 4*l.*, 3*l.*, 2*l.* and 1*l.* for candidates resident in the County of Somerset.⁵

Special Prizes of 4*l.*, 3*l.*, 2*l.* and 1*l.* for candidates resident in the County of Worcester.⁶

¹ Offered by the Worshipful Company of Farriers.

² Offered by the National Master Farriers' Association.

³ Offered by the Devon County Agricultural Committee.

⁴ Offered by the Gloucestershire Agricultural Committee.

⁵ Offered by the Somerset County Agricultural Committee.

⁶ Offered by the Worcestershire Agricultural Committee.

Prize List for Bristol Show, 1913.

FARM PRIZES (£500).¹

(Open to bonâ-fide Tenant Farmers.)

The following Prizes are offered by the Bristol Local Committee for the best-managed Farms in Gloucestershire.

CLASS I.—Farm of 250 acres or over, exclusive of Down. 1st Prize, 80*l.* ; 2nd Prize, 40*l.* (Five entries).

CLASS II.—Farm of not less than 50 acres and under 250 acres exclusive of Down. 1st Prize, 50*l.* ; 2nd Prize, 30*l.* (Three entries).

For the best-managed Farms in Somersetshire and Dorsetshire.

CLASS III.—Farm of 300 acres or over, exclusive of Down. 1st Prize, 80*l.* ; 2nd Prize, 40*l.* (Seven entries).

CLASS IV.—Farm of not less than 150 acres and under 300 acres, exclusive of Down. 1st Prize, 80*l.* ; 2nd Prize, 40*l.* (Eleven entries).

CLASS V.—Farm of not less than 50 acres and under 150 acres exclusive of Down. 1st prize, 40*l.* ; 2nd Prize, 20*l.* (Six entries).

HORTICULTURAL EXHIBITION.¹

Prizes amounting to 350*l.*

DOG SHOW.

The National Terrier Club's Show will be held on July 3 and 4.

¹ Offered by the Bristol Local Committee.

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General Privileges of Governors and Members.

FREE ADMISSION TO SHOWS.

The Society holds every year an Exhibition of Live Stock, Farm Produce, and Implements, to which, and to the unreserved portions of the Grand Stands at the Horse Ring, Dairy, and elsewhere, Members are entitled to free admission.

REDUCED RATES FOR ENTRIES AT THE ANNUAL SHOW.

Entries of Horses, Cattle, Sheep, Pigs, Poultry, Produce, &c., can be made by Members at reduced rates. For Implement exhibits the entry-fee of £1 payable in addition to the charges for space is not charged when a partner of the firm is a Member of the Society. Firms and Companies may secure these privileges by the Membership of one or more of their partners.

SOCIETY'S JOURNAL AND OTHER PUBLICATIONS.

Every Member is entitled to receive, without charge, a copy of the Journal of the Society, each Volume of which contains articles and communications by leading authorities on the most important agricultural questions of the day, together with official reports by the Society's Scientific Advisers and on the various departments of the Annual Shows, and other interesting features.

Copies of the Journal may be obtained by Non-Members of the Publisher, Mr. JOHN MURRAY, 50A Albemarle Street, W., at the price of ten shillings per copy.

Copies of the Society's pamphlets, sold at not less than One Shilling each, are obtainable by Members at *half price* on direct application to the Secretary.

LIBRARY AND READING ROOM.

The Society has a large and well-stocked library of standard books on agricultural subjects. A Reading Room is provided, at which the principal agricultural newspapers and other periodicals can be consulted by Members during office hours (10 a.m. to 4 p.m.; Saturdays, 10 a.m. to 2 p.m.).

CHEMICAL PRIVILEGES.

The Society makes annually a considerable grant from its general funds in order that Members may obtain at low rates analyses of feeding stuffs, fertilisers, soils, &c., by the Society's Consulting Chemist (Dr. J. AUGUSTUS VOELCKER, Analytical Laboratory, 1 Tudor Street, London, E.C.). Members may also consult Dr. VOELCKER either personally or by letter at a small fee.

VETERINARY PRIVILEGES.

Members can consult the Professors of the Royal Veterinary College, Camden Town, N.W., at fixed rates of charge, and they have the privilege of sending Cattle, Sheep, and Pigs to the College Infirmary on the same terms as subscribers to the College.

BOTANICAL PRIVILEGES.

Reports can be obtained by Members from the Society's Botanist (Professor R. H. BIFFEN, M.A., School of Agriculture, Cambridge), on the purity and germinating power of seeds, and on diseases or weeds affecting farm crops, at a fee of one shilling in each case.

ZOOLOGICAL PRIVILEGES.

Information respecting any animal (quadruped, bird, insect, worm, &c.) which, in any stage of its life, affects the farm or rural economy generally, with suggestions as to methods of prevention and remedy in respect to any such animal that may be injurious, can be obtained by Members from the Society's Zoologist (Mr. CECIL WARBURTON, M.A., School of Agriculture, Cambridge) at a fee of one shilling in each case.

GENERAL MEETINGS OF GOVERNORS AND MEMBERS.

The Annual General Meeting of Governors and Members is held in London during the week of the Smithfield Club Show. A General Meeting is usually also held in the Showyard during the week of the Show.

SPECIAL PRIVILEGES OF GOVERNORS

In addition to the privileges of Members, as described above, Governors are entitled to an extra copy of each Volume of the Journal, to attend and speak at all meetings of the Council, and are alone eligible for election as President, Trustee, and Vice-President. The minimum Annual Subscription of a Governor is £5, with a Life Composition of £50.

Royal Agricultural Society of England.



STATEMENT OF PRIVILEGES OF MEMBERSHIP.

CHEMICAL.—Advice to Buyers of Fertilisers and Feeding Stuff; Analyses; Sample of Order Form, &c. (page ii.).

BOTANICAL.—Information on purchase and value of Seeds and other matters; Suggestions and Samples of Order Form (page vii.).

ZOOLOGICAL.—Information on Pests of Farm Crops, Fruit and Forest Trees, and Domesticated Animals, &c. (page xi.).

VETERINARY.—Privileges and Information (page xii.)

GENERAL PRIVILEGES.

FREE ADMISSION to Show, Grand Stand, &c., and use of Members' Pavilion in Show Yard.

SOCIETY'S JOURNAL and other Publications.

LIBRARY AND READING ROOM, 16 Bedford Square.

(Open to Members from 10 a.m. to 4 p.m.; Saturdays, 10 a.m. to 2 p.m.)

REDUCED RATES for entry of Live Stock, Implements, Produce, &c., at Show.

TERMS OF MEMBERSHIP.

| | | | | |
|------------------------------|---|---|---------|------|
| ANNUAL SUBSCRIPTION—Governor | - | - | Minimum | £5. |
| Member | - | - | Minimum | £1. |
| LIFE COMPOSITIONS—Governor | - | - | - | £50. |
| Member | - | - | - | £15. |

16 BEDFORD SQUARE, W.C.

January, 1913.

THOMAS McROW,
Secretary.

Telegraphic Address: "PRACTICE, LONDON." Telephone Number: "GERRARD 3675."

MEMBERS' PRIVILEGES OF CHEMICAL ANALYSIS.

(Applicable only to the case of persons who are not commercially engaged in the manufacture or sale of any substance sent for Analysis.)

THE COUNCIL HAVE FIXED THE FOLLOWING

RATES OF CHARGES FOR CHEMICAL ANALYSIS

TO MEMBERS OF THE SOCIETY.

These privileges are applicable only when the Analyses are for *bonâ fide* agricultural purposes, and are required by Members of the Society for their own use and guidance in respect of farms or land in their own occupation and within the United Kingdom.

The Analyses are given on the understanding that they are required for the individual and sole benefit of the Member applying for them, and must not be used for other persons, or for commercial purposes.

The Analyses and reports may not be communicated to either vendor or manufacturer, except in cases of dispute.

Land or estate agents, bailiffs, and others, when forwarding samples, are required to state the names of those Members on whose behalf they apply.

| | £ | s. | d. |
|--|----|----|----|
| 1.—An opinion on the purity of any Fertiliser or Feeding Stuff (so far as this can be given without detailed analysis) . . . | 1 | 0 | |
| 2.—Determination of any <i>one</i> ordinary constituent in a Fertiliser or Feeding Stuff | 2 | 6 | |
| 3.—Determination of Potash | 5 | 0 | |
| 4.—Commercial Analysis of any ordinary Fertiliser or Feeding Stuff | 5 | 0 | |
| 5.—Full Analysis of any compound Fertiliser or Feeding Stuff | 10 | 0 | |
| 6.—Analysis of any other material in ordinary use for agricultural purposes | 10 | 0 | |
| 7.—Analysis of Milk, Cream, Butter, or other Dairy produce from Members' own farms | 2 | 6 | |
| (N.B.—Samples in any way connected with the Sale of Food and Drugs Acts are not undertaken for analysis.) | | | |
| 8.—Analysis of Water | 1 | 10 | 0 |
| 9.—Analysis of Soil—determination of Lime only | 10 | 0 | |
| 10.—Analysis of Soil—partial | 1 | 0 | 0 |
| 11.—Analysis of Soil—complete | 3 | 0 | 0 |
| 12.—Consultation by letter or personal appointment | 5 | 0 | |

OPINION OF VALUE.

With the analysis will be given, as far as possible, an opinion as to whether an article analysed is worth the price asked for it, or not, provided the cost of the same, together with guarantee (if any) and other particulars relating to the purchase, be given at the time.

ALL SAMPLES AND COMMUNICATIONS, TOGETHER WITH FEES FOR ANALYSIS, TO BE ADDRESSED TO—

**DR. VOELCKER, Analytical Laboratory,
1, Tudor Street, London, E.C.**

Instructions for Selecting and Sending Samples for Analysis.

GENERAL RULES.—(1.) A sample taken for analysis should be fairly *representative of the bulk* from which it has been drawn.—(2.) The sample should reach the Analyst *in the same condition* that it was in at the time when drawn.

When **Fertilisers** are delivered in bags, select four or five of these from the bulk, and either turn them out on a floor and rapidly mix their contents, or else drive a shovel into each bag and draw out from as near the centre as possible a couple of shovelfuls of the manure, and mix these quickly on a floor.

Halve the heap obtained in either of these ways, take one half (rejecting the other) and mix again rapidly, flattening down with the shovel any lumps that appear. Repeat this operation until at last only some three or four pounds are left.

From this fill three tins, holding from $\frac{1}{2}$ lb. to 1 lb. each, mark, fasten up and seal each of these. Send one for analysis, and retain the others for reference.

Or,—the manure may be put into glass bottles provided with well-fitting corks; the bottles should be labelled and the corks sealed down. The sample sent for analysis can be packed in a wooden box and sent by post or rail.

When manures are delivered in bulk, portions should be successively drawn from *different parts* of the bulk, the heap being turned over now and again. The portions drawn should be thoroughly mixed, subdivided, and, finally, samples should be taken as before, except that when the manure is coarse and bulky it is advisable to send larger samples than when it is in a finely divided condition.

Linseed, Cotton, and other Feeding Cakes.—If a single cake be taken, three strips should be broken off right across the cake, and from the middle portion of it, one piece to be sent for analysis, and the other two retained for reference. Each of the three pieces should be marked, wrapped in paper, fastened up, and sealed. The piece forwarded for analysis can be sent by post or rail.

A more satisfactory plan is to select four to six cakes from different parts of the delivery, then break off a piece about four inches wide from the middle of each cake, and pass these pieces through a cake-breaker. The broken cake should then be well mixed and three samples of about 1 lb. each should be taken and kept in tins or bags, duly marked, fastened, and sealed as before. One of these lots should be sent for analysis, the remaining two being kept for reference. It is advisable also with the broken pieces to send a small strip from an unbroken cake.

Feeding Meals, Grain, &c.—Handfuls should be drawn from the centre of half a dozen different bags of the delivery; these lots should then be well mixed, and three $\frac{1}{2}$ -lb. tins or bags filled from the heap, each being marked, fastened up, and sealed. One sample is to be forwarded for analysis and the others retained for reference.

Soils.—Have a wooden box made 6 inches in length and width, and from 9 to 12 inches deep, according to the depth of soil and subsoil of the field. Mark out in the field a space of about 12 inches square; dig round in a slanting direction a trench, so as to leave undisturbed a block of soil and its subsoil 9 to 12 inches deep; trim this block to make it to fit into the wooden box, invert the open box over it, press down firmly, then pass a spade under the box and lift it up, gently turn over the box, nail on the lid, and send by rail. The soil will then be received in the position in which it is found in the field.

In the case of very light, sandy, and porous soils, the wooden box may be at once inverted over the soil, forced down by pressure, and then dug out.

Waters.—Samples of water are best sent in glass-stoppered Winchester bottles, holding half a gallon. One such bottle is sufficient for a single sample. Care should be taken to have these scrupulously clean. In taking a sample of water for analysis it is advisable to reject the first portion drawn or pumped, so as to obtain a sample of the water when in ordinary flow. The bottle should be rinsed out with the water that is to be analysed, and it should be filled nearly to the top. The stopper should be secured with string, or be tied over with linen or soft leather. The sample can then be sent carefully packed either in a wooden box with sawdust, &c., or in a hamper with straw.

Milk.—A pint bottle should be sent in a wooden box.

GENERAL INSTRUCTIONS. **Time for Taking Samples.**—All samples, both of fertilisers and feeding stuffs, should be taken as soon after their delivery as possible, and should reach the Analyst within *ten days* after delivery of the article. In every case it is advisable that the Analyst's certificate be received before a fertiliser is sown or a feeding stuff is given to stock.

Procedure in the Event of the Vendor wishing Fresh Samples to be Drawn.—Should a purchaser find that the Analyst's certificate shows a fertiliser or feeding stuff not to come up to the guarantee given him, he may inform the vendor of the result and complain accordingly. He should then send to the vendor *one* of the two samples which he has kept for reference. If, however, the vendor should demand that a fresh sample be drawn, the purchaser must allow this, and also give the vendor an opportunity of being present, either in person or through a representative whom he may appoint. In that case three samples should be taken in the presence of both parties with the same precautions as before described, *each* of which should be duly packed up, labelled and sealed by both parties. One of these is to be given to the vendor, one is to be sent to the Analyst, and the third is to be kept by the purchaser for reference or future analysis if necessary.

Suggestions to Purchasers of Fertilisers and Feeding Stuffs.

Purchasers are recommended in all cases to insist on having an **INVOICE**, and to see that such invoice contains the following particulars:—

In the case of **Fertilisers**:—

- (1) The name of the Fertiliser.
- (2) Whether the Fertiliser is artificially compounded or not.
- (3) The minimum analysis of the Fertiliser in respect of its principal fertilising ingredients.

In the case of artificially prepared **Feeding Stuffs** for Cattle:—

- (1) The name of the article.
- (2) The description of the article—whether it has been prepared (a) from one substance or seed, or (b) from more than one substance or seed.
- (3) The percentages of oil and albuminoids guaranteed.

For example:

- (a) An invoice describing an article as "Linseed Cake" implies a warranty that the article is pure, *i.e.* is prepared from linseed only; "Cotton Cake" (whether decorticated or undecorticated), and "Rape Cake" (for feeding purposes), would come under a similar category.

Purchasers are reminded that the use of such terms as "95 per cent.," "Oil Cake," &c., affords no security against adulteration. The adoption of the ORDER FORM issued by the Society is therefore strongly recommended.

- (b) In the case of a Compound Cake or Feeding Stuff, a Vendor is compelled by the Fertilisers and Feeding Stuffs Act of 1906 to state the percentages of oil and albuminoids guaranteed, and that it is prepared from more than one substance, but he is not required to specify the particular materials used in its preparation. Purchasers are recommended, therefore, to buy Mixed Feeding Cakes, Meals, &c., with a guaranteed analysis. Any statements in the invoice as to the component parts of such Mixed Cake or Meal will take effect as a warranty, as also will any statements in an invoice, circular, or advertisement as to the percentages of nutritive and other ingredients in any article sold for use as food for cattle.

Members of the Society are strongly recommended not only to see that the invoices given to them accurately describe the goods they have ordered, but to make all their orders *subject to the Analysis and Report of the Consulting Chemist of the Royal Agricultural Society of England*. Copies of a Form of Order (see page v.) for this purpose may be obtained on application to the Secretary.

Attention is particularly directed to the recommendations below as to the qualities of Fertilisers and Feeding Stuffs which purchasers should demand.

Conditions of Purchase and Sale.

FERTILISERS.

Raw Bones, Bone-meal, or Bone-dust to be guaranteed "PURE," and to contain not less than 45 per cent. of Phosphate of Lime, and not less than 4 per cent. of Ammonia.

Steamed or "Degelatinized" Bones to be guaranteed "PURE," and to contain not less than 55 per cent. of Phosphate of Lime, and not less than 1 per cent. of Ammonia.

Mineral Superphosphate of Lime to be guaranteed to contain a certain percentage of "Soluble Phosphate." [From 25 to 28 per cent. of Soluble Phosphate is an ordinarily good quality.]

Dissolved Bones to be guaranteed to be "made from raw bone and acid only," and to be sold as containing stated minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia.

Compound Artificial Manures, Bone Manures, Bone Compounds, &c., to be sold by analysis stating the minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia contained.

Basic Slag to be guaranteed to be sufficiently finely ground that 80 to 90 per cent. passes through a sieve having 10,000 meshes to the square inch, and to contain a certain percentage of Phosphoric Acid or its equivalent in Phosphate of Lime. [The highest grades range from 17 to 20 per cent. of Phosphoric Acid; medium grades 14 to 16 per cent.; and low grades from 10 to 12 per cent. of Phosphoric Acid.]

Peruvian Guano to be described by that name, and to be sold by analysis stating the minimum percentages of Phosphates and Ammonia.

Sulphate of Ammonia to be guaranteed "PURE," and to contain not less than 24 per cent. of Ammonia.

Nitrate of Soda to be guaranteed "PURE," and to contain 95 per cent. of Nitrate of Soda.

Kainit to be guaranteed to contain 23 per cent. of Sulphate of Potash.

All Fertilisers to be delivered in good and suitable condition for sowing.

FEEDING STUFFS.

Linseed Cake, Cotton Cake (Decorticated and Undecorticated), and **Rape Cake** (for feeding purposes) to be pure, *i.e.* prepared *only* from the one kind of seed from which their name is derived; and to be in sound condition. The percentages of oil and albuminoids guaranteed must also be stated. The Report of the Consulting Chemist of the Royal Agricultural Society of England to be conclusive as to the "purity" or otherwise of any feeding stuffs.

Mixed Feeding Cakes, Meals, &c., to be sold on a guaranteed analysis, giving the percentages of oil and albuminoids, to be sound in condition, and to contain nothing of an injurious nature, or ingredients that are worthless for feeding purposes.

ORDER FORM (SAMPLE)
FOR FERTILISERS OR FEEDING STUFFS.



To

Address

Date

Please supply me for Delivery

Cwt. of

At per ton.

GUARANTEED to be in accordance with the conditions specified on the back hereof, relating to this article, and subject to the analysis and report of the Consulting Chemist of the Royal Agricultural Society of England.

(Signature of Member)

NOTE.—Copies of this Form will be forwarded to Members on application to the Secretary.

[P.T.O.]

CONDITIONS OF PURCHASE AND SALE.

FERTILISERS.

Raw Bones, Bone-meal, or Bone-dust to be guaranteed "PURE," and to contain not less than 45 per cent. of Phosphate of Lime, and not less than 4 per cent. of Ammonia.

Steamed or "Degelatinized" Bones to be guaranteed "PURE," and to contain not less than 55 per cent. of Phosphate of Lime, and not less than 1 per cent. of Ammonia.

Mineral Superphosphate of Lime to be guaranteed to contain a certain percentage of "Soluble Phosphate." [From 25 to 28 per cent. of Soluble Phosphate is an ordinarily good quality.]

Dissolved Bones to be guaranteed to be "made from raw bone and acid only," and to be sold as containing stated minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia.

Compound Artificial Manures, Bone Manures, Bone Compounds, &c., to be sold by analysis stating the minimum percentages of Soluble Phosphate, Insoluble Phosphates, and Ammonia contained.

Basic Slag to be guaranteed to be sufficiently finely ground that 80 to 90 per cent. passes through a sieve having 10,000 meshes to the square inch, and to contain a certain percentage of Phosphoric Acid or its equivalent in Phosphate of Lime. [The highest grades range from 17 to 20 per cent. of Phosphoric Acid; medium grades 14 to 16 per cent.; and low grades from 10 to 12 per cent. of Phosphoric Acid.]

Peruvian Guano to be described by that name, and to be sold by analysis stating the minimum percentages of Phosphates and Ammonia.

Sulphate of Ammonia to be guaranteed "PURE," and to contain not less than 24 per cent. of Ammonia.

Nitrate of Soda to be guaranteed "PURE," and to contain 95 per cent. Nitrate of Soda.

Kainit to be guaranteed to contain 23 per cent. of Sulphate of Potash.

All Fertilisers to be delivered in good and suitable condition for sowing.

FEEDING STUFFS.

Linseed cake, Cotton cake (Decorticated and Undecorticated), and **Rape cake** (for feeding purposes) to be pure, *i.e.*, prepared *only* from the one kind of seed from which their name is derived; and to be in sound condition. The percentages of oil and albuminoids guaranteed must also be stated. The Report of the Consulting Chemist of the Royal Agricultural Society of England to be conclusive as to the "purity" or otherwise of any feeding stuffs.

Mixed Feeding-cakes, Meals, &c., to be sold on a guaranteed analysis, giving the percentages of oil and albuminoids, to be in sound condition, and to contain nothing of an injurious nature, or ingredients that are worthless for feeding purposes.

MEMBERS' BOTANICAL PRIVILEGES.

THE COUNCIL HAVE FIXED THE FOLLOWING

RATES OF CHARGES FOR THE EXAMINATION OF PLANTS AND SEEDS

BY THE SOCIETY'S BOTANIST.

The charge for examination must be paid at the time of application, and the carriage of all parcels must be prepaid. When, however, *bonâ fide* inquiries require no special investigation the fees will be returned with the reply.

- 1.—Report on the purity and germinating capacity of samples of agricultural seeds, with a statement as to the nature and amount of the impurities or adulterants present . 1s.
 - 2.—Report on the constitution of mixtures of grass seeds and an opinion as to their suitability for temporary leys, permanent pastures, &c. 1s.
 - 3.—Identification of weeds and poisonous plants with suggestions for their eradication 1s.
 - 4.—Report on the fungoid diseases affecting farm crops, with an account of the methods suitable for their treatment, where known 1s.
 - 5.—Report on the natural herbage of a district as a guide to the formation of permanent pastures 1s.
 - 6.—Report on the suitability or otherwise of the different varieties of the chief farm crops for local conditions (where the information is available), stating their average cropping capacity as compared with other varieties, their quality, power of resistance to various diseases, and general purity to type 1s.
 - 7.—Reports on any other matters of a botanical nature of interest to agriculturists 1s.
-

PURCHASE OF SEEDS.

The purchaser should obtain from the vendor, by invoice or other writing, the proper designation of the seeds he buys, with a guarantee of the percentage of purity and germination, and of its freedom from ergot, and, in the case of clover, from the seeds of dodder and broom-rape.

Copies of the "Order Form and Conditions of Purchase and Sale of Seeds" (see page ix) may be obtained by Members on application to the Secretary, at 16 Bedford Square, London, W.C.

MEMBERS' BOTANICAL PRIVILEGES (*continued*).

THE SAMPLING OF SEEDS.

The utmost care should be taken to secure a fair and honest sample. This should be drawn from the bulk delivered to the purchaser, and not from the sample sent by the vendor.

When legal evidence is required, the sample should be taken from the bulk, and placed in a sealed bag in the presence of a witness. Care should be taken that the sample and bulk be not tampered with after delivery, or mixed or brought in contact with any other sample or bulk.

At least one ounce of grass and other small seeds should be sent, and two ounces of cereals and the larger seeds. When the bulk is obviously impure, the sample should be at least double the amount specified. Grass seeds should be sent at least four weeks, and seeds of clover and cereals two weeks before they are to be used.

The exact name under which the sample has been sold and analysed should accompany it.

REPORTING THE RESULTS.

The Report will be made on a schedule in which the nature and amount of impurities will be stated, and the number of days each sample has been under test, with the percentage of the seeds which have germinated.

"Hard" clover seeds, though not germinating within the time stated, will be considered good seeds, and their percentage separately stated.

The impurities in the sample, including the chaff of the species tested, will be specified in the schedule, and only the percentage of the pure seed of that species will be reported upon; but the REAL VALUE of the sample will be stated. The Real Value is the combined percentages of purity and germination, and is obtained by multiplying these percentages and dividing by 100; thus in a sample of Meadow Fescue having 88 per cent. purity and 95 per cent. germination, 88 multiplied by 95 gives 8,360, and this divided by 100 gives 83.6, the Real Value.

SELECTING SPECIMENS OF PLANTS.

When a specimen is sent for determination, the whole plant should be taken up and the earth shaken from the roots. If possible, the plants must be in flower or fruit. They should be packed in a light box, or in a firm paper parcel.

Specimens of diseased plants or of parasites should be forwarded as fresh as possible. They should be placed in a bottle, or packed in tinfoil or oil-silk.

All specimens should be accompanied with a letter specifying the nature of the information required, and stating any local circumstances (soil, situation, &c.) which, in the opinion of the sender, would be likely to throw light on the inquiry.

PARCELS OR LETTERS CONTAINING SEEDS OR PLANTS FOR EXAMINATION MUST BE ADDRESSED (CARRIAGE OR POSTAGE PREPAID) TO—

PROFESSOR R. H. BIFFEN, M.A.,
School of Agriculture, Cambridge.

ORDER FORM (SAMPLE)

AND

CONDITIONS OF PURCHASE AND SALE OF SEEDS.



FROM

TO

.....

.....

.....

.....

PLEASE SUPPLY me for Delivery the Seeds specified in the ORDER FORM on the back hereof, it being guaranteed that each kind of seed is practically free from impurities; that the Grass seeds are free from Ergot, and the Clovers free from Dodder and Broom Rape seeds; that the germination is not less than is specified on the back hereof; and further that the purchase is subject to the examination and germination tests of the Botanist of the Royal Agricultural Society of England, whose opinion shall be final.

(Signature of Member).....

Date.....

NOTE.—Copies of this Form will be forwarded to Members on application to the Secretary. [P.T.O.]

ORDER.

Quantity.

| | |
|----------------------------------|--------------------------|
|Cocksfoot | germinating 90 per cent. |
|Meadow Fescue | „ 95 per cent. |
|Tall Fescue | „ 90 per cent. |
|Meadow Foxtail | „ 70 per cent. |
|Timothy | „ 95 per cent. |
|Rough Stalked Meadow Grass | „ 80 per cent. |
|Smooth Stalked Meadow Grass | „ 70 per cent. |
|Perennial Ryegrass | „ 95 per cent. |
|Italian Ryegrass | „ 95 per cent. |
|Red Clover | „ 98 per cent. |
|Alsike | „ 98 per cent. |
|White Clover | „ 98 per cent. |
|Trefoil | „ 98 per cent. |
|Yarrow | „ 80 per cent. |

{
 "Hard" Seeds
 being included
 as germinable
 Seeds.

Variety.

| | |
|---|----------------|
|Wheat | „ 98 per cent. |
|Barley | „ 98 per cent. |
|Oats | „ 98 per cent. |
|Turnips | „ 98 per cent. |
|Swede Turnips | „ 98 per cent. |
|Cabbage | „ 98 per cent. |
|Mangel Wurzel, 75 per cent. of fruits, each containing at least one germinating seed. | |

.....

Signature.....

MEMBERS' ZOOLOGICAL PRIVILEGES.

The Council have fixed the charge of 1s. for information to be supplied, by the Society's Zoologist, respecting any injurious (animal, quadruped, bird, insect, worm, &c.) pests.

(1) FARM CROPS.

All the ordinary farm crops are subject to numerous pests, some attacking the roots, some the leaves, others the stem or the blossom. The first necessity is the accurate identification of the pest in any case, for a knowledge of its life-history often suggests a method of dealing with it.

(2) FRUIT TREES.

There are a great number of orchard and bush-fruit pests. Some (codlin moth, pear-midge, &c.) attack the fruit; others (red-spider, aphis, caterpillars, &c.) the leaves; others (woolly aphis, boring beetles, &c.) the stem. Information will be given as to the identity of any pest and the best way of combating it.

(3) FOREST TREES.

Advice will be given with regard to the treatment of forest-tree pests, in plantations, nursery gardens, or ornamental grounds. Such pests may attack the trunks (beech-scale, boring insects, &c.), the leaves (caterpillars aphis, &c.), or the roots (cockchafer, grubs, &c., in young plantations).

(4) DOMESTICATED ANIMALS.

Animal parasites, whether external or internal, may be sent for identification and advice. They include worms, fly-maggots, ticks, lice, &c., and many well-known diseases (warbles, gapes, &c.) are due to them.

Diseases of animals due to other causes should be referred to the Veterinary Department.

N.B.—It is very important that specimens should reach the Zoologist fresh and in good condition. It is often impossible to determine the cause of injury in the case of crushed and shrivelled material. Tin boxes should be used, and some damp blotting-paper inserted to prevent undue drying. In the case of root-pests, the root should be sent with its surrounding soil.

PARCELS OR LETTERS CONTAINING SPECIMENS (CARRIAGE OR POSTAGE PAID) MUST BE ADDRESSED TO—

Mr. CECIL WARBURTON, M.A.,
School of Agriculture, Cambridge.

MEMBERS' VETERINARY PRIVILEGES.

In order to enable Members to obtain the highest possible Veterinary advice when the necessity arises, the Society has entered into an agreement with the Royal Veterinary College, under which diseased animals may be admitted to the College Infirmary for treatment, and the Professors of the College may be consulted or called upon to investigate outbreaks of disease at greatly reduced fees.

I.—ADMISSION OF SICK OR DISEASED ANIMALS TO THE ROYAL VETERINARY COLLEGE.

Members of the Society have all the privileges of subscribers to the Royal Veterinary College, Camden Town, N.W., so far as the admission for treatment of Cattle, Sheep, and Swine is concerned, without being called upon to pay the annual subscription to the College of two guineas. The charges made by the College for keep and treatment are as follows:—Cattle, 10s. 6d., and Sheep and Pigs, 3s. 6d. per week for each animal.

The full privileges of subscribers, including the examination of horses, and the admission of horses and dogs into the College Infirmary for surgical or medical treatment, on payment of the cost of keep, will be accorded to Members of the Society on payment of a subscription to the College of one guinea instead of two guineas per annum.

II.—FEES FOR CONSULTATIONS, ANALYSES, AND EXAMINATIONS AT THE ROYAL VETERINARY COLLEGE.

The following fees are payable by Members of the Society for services performed at the Royal Veterinary College on their behalf in cases where a visit to the locality is not involved:—

| | £ | s. | d. |
|--|----|----|----|
| Personal consultation with a Veterinary Professor | 10 | 6 | |
| Consultation by letter | 10 | 6 | |
| Post-mortem examination of an animal and report thereon | 1 | 1 | 0 |
| Chemical Examination of viscera for any specified metallic poison | 10 | 6 | |
| Chemical Examination of viscera for metallic poisons | 1 | 0 | 0 |
| Chemical Examination of viscera for vegetable poisons | 1 | 0 | 0 |
| Chemical Examination of viscera complete, for metals and alkaloids | 2 | 0 | 0 |

(The above fees do not apply to cases which involve a visit to the locality.)

III.—INVESTIGATION OF OUTBREAKS OF DISEASE AMONG FARM STOCK.

In the event of any obscure outbreak of disease among Cattle, Sheep, or Swine occurring on the farm of any Member of the Society, application should at once be made to the PRINCIPAL of the ROYAL VETERINARY COLLEGE, CAMDEN TOWN, LONDON, N.W.

The Principal will then instruct an officer of the College to inquire into the outbreak and report to him. He will also fix the amount of remuneration to be paid to the Inspector, whose professional fee will in no case exceed two guineas per day, exclusive of the actual cost of travelling and maintenance.

When it appears, on the report of the Inspector selected, that the outbreak was of an important character or of general interest, the cost of the investigation will be defrayed by the Royal Veterinary College.

PUBLICATIONS OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND. JOURNAL OF THE SOCIETY.

Now published annually as an Annual Volume in paper covers of about 500 pages. Free to Members; Price to Non-Members, Ten Shillings.

TEXT-BOOK ON AGRICULTURE.

ELEMENTS OF AGRICULTURE: a Text-book prepared under the authority of the Royal Agricultural Society of England by the late W. FREAM, LL.D. Eighth (Revised and Enlarged) Edition (44th Thousand), edited by J. R. AINSWORTH-DAVIS M.A. 692 pp. with 333 Illustrations. 1911. Price 5s. nett, bound in cloth.

FARM ACCOUNT BOOKS.

No. 1, A DIARY, combining Cash Account with daily record of Farm Transactions. Price 4s.
No. 2, A FARM ACCOUNT BOOK, showing payments and receipts, and supplying a form of Annual Balance Sheet. Price 5s. 6d. Published for the Society and sold by Messrs. FORSTER, GROOM & CO., Ltd., 15 Charing Cross, London, S.W.

PAMPHLETS.

VETERINARY PAMPHLETS BY PROFESSOR SIR GEORGE BROWN, C.B.:
DENTITION AS INDICATIVE OF THE AGE OF FARM ANIMALS. Sixth Edition (1913). 64 pp. With 60 Illustrations. Price 1s.

ANIMALS OF THE FARM IN HEALTH AND DISEASE. 72 pp. With 52 Illustrations. Fourth Edition (1909). Price 1s.

THE STRUCTURE OF THE HORSE'S FOOT AND THE PRINCIPLES OF SHOEING. 23 pp. Fourth and Enlarged Edition (1902). With 12 Illustrations. Price 6d.

CONTAGIOUS FOOT ROT OF SHEEP. Second and Enlarged Edition (1905). 24 pp. With 8 Illustrations. Price 1s.

OTHER VETERINARY PAMPHLETS:

THE MARE AND FOAL. By Professor J. WORTLEY AXE, M.R.C.V.S. 58 pp. With 20 Illustrations. Second Edition (1909). Price 1s.

THE LAMING PEN. By HAROLD LEENEY. 2nd Ed. (1907). 37 pp. With 9 Illustrations. Price 6d.
TUBERCULOSIS AS REGARDS HEREDITY IN CAUSATION AND ELIMINATION FROM INFECTED HERDS. By PROFESSOR SIR JOHN MCFADYEAN, M.B., B.Sc., C.M. (1911). 19 pp. Price 1s.

PAMPHLETS BY MR. CHARLES WHITEHEAD, F.L.S., F.G.S.:

PRACTICAL HINTS ON FRUIT FARMING. (1904). With 10 Illustrations. 43 pp. Price 1s.

HOP CULTIVATION. With 13 Illustrations (1893). 46 pp. Price 1s.

DAIRY PAMPHLETS:

(Issued under the authority of the Dairy Committee of the Society.)

THE PRACTICE OF (a) CHEDDAR, (b) CHESHIRE, AND (c) STILTON CHEESE-MAKING. Price 2d. each.

SIMPLE RULES FOR BUTTER-MAKING. Revised, 1907. (Sheet.) Price 1d. each, or 5s. per 100. Mounted on card and varnished, to hang up in the Dairy, 6d. each.

RECIPES FOR MAKING CREAM AND SOFT CHEESES. Price 1d.

OTHER PAMPHLETS:

THE VALUATION OF UNEXHAUSTED MANURES OBTAINED BY THE CONSUMPTION OF FOODS BY STOCK. By J. AUGUSTUS VOELCKER, M.A., B.Sc., Ph.D., and A. D. HALL, M.A. With 3 Diagrams (1903). 41 pp. Price 1s.

PRACTICAL HINTS ON VEGETABLE FARMING. By JAMES UDALE (1904). With 15 Illustrations. 41 pp. Price 1s.

TABLES FOR ESTIMATING DEAD WEIGHT AND VALUE OF CATTLE FROM LIVE WEIGHT. By Sir JOHN B. LAWES, Bart., F.R.S. Price 1s.

THE WOBNURN EXPERIMENTAL STATION OF THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND. By J. AUGUSTUS VOELCKER, M.A., B.Sc., Ph.D. Annual Reports on Field, Feeding, and Pot-culture Experiments (1899-1910). Price 1s. each.

REPORT ON THE WOBNURN POT-CULTURE STATION. By J. AUGUSTUS VOELCKER, M.A., B.Sc., Ph.D. With 17 Illustrations (1900). 52 pp. Price 2s. 6d.

THE MAKING OF THE LAND IN ENGLAND. By ALBERT PELL. (1899). 27 pp. Price 6d.

THE MANAGEMENT AND PLANTING OF BRITISH WOODLANDS. By Professor CHARLES E. CURTIS, F.S.L. (1904). With 6 Illustrations. 36 pp. Price 1s.

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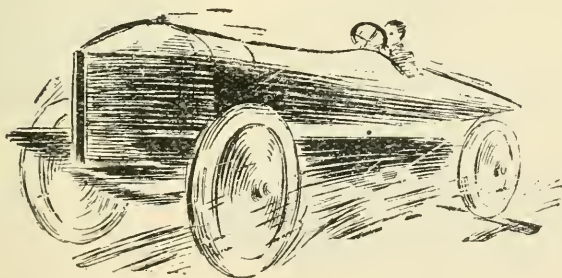
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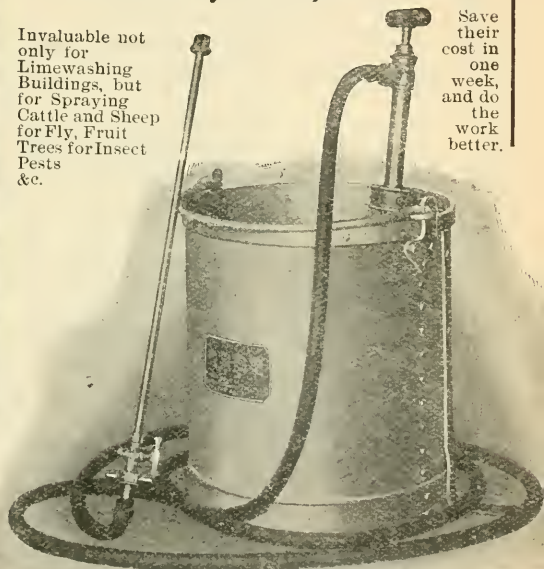
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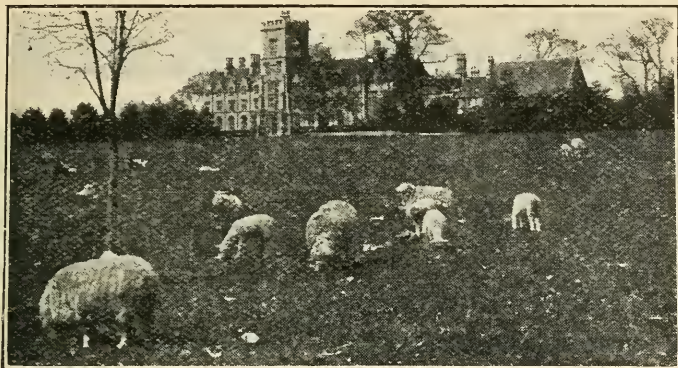
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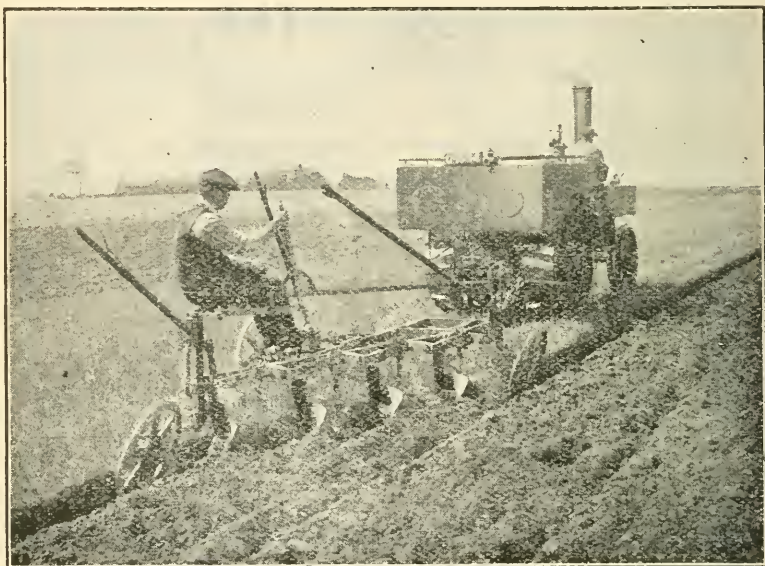
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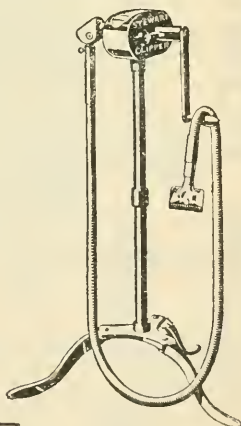
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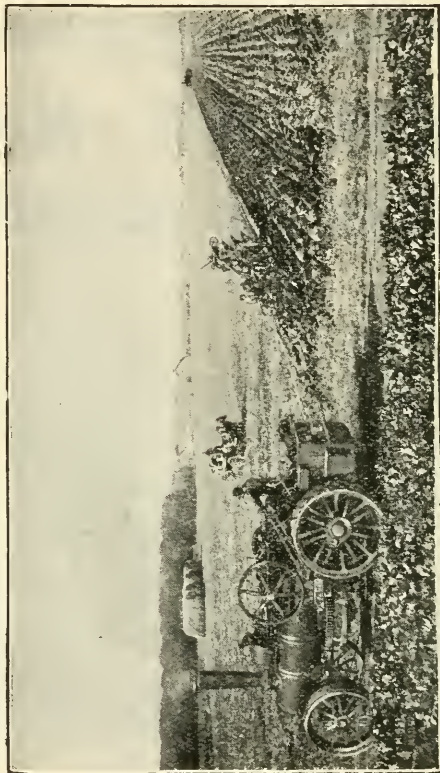
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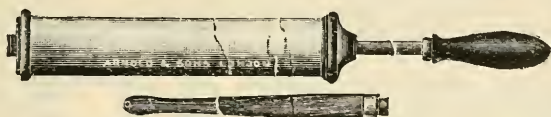
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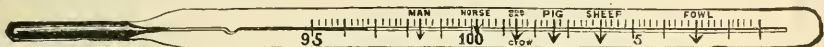


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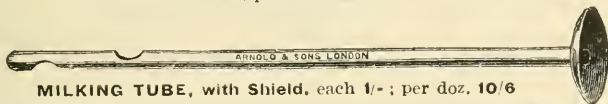


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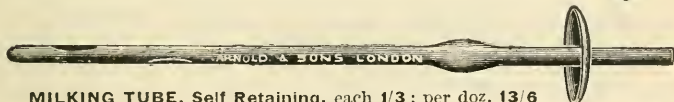
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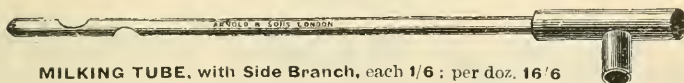
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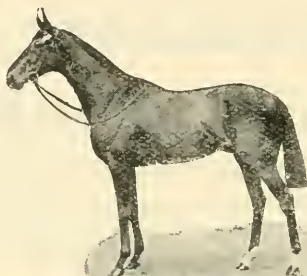


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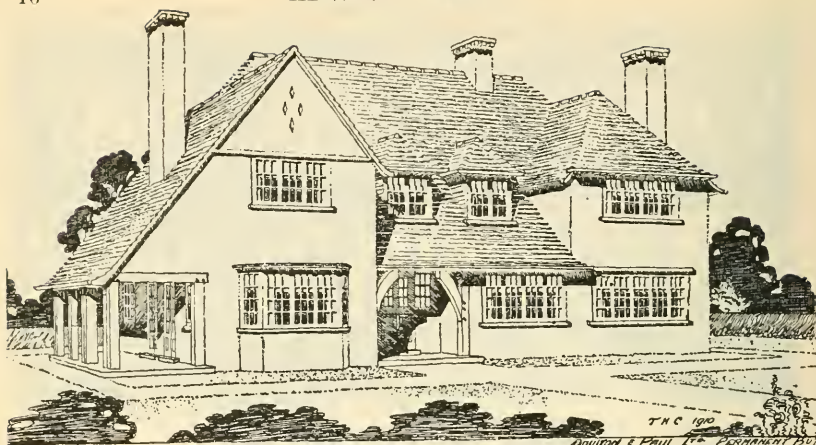
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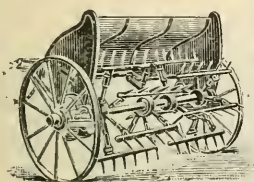
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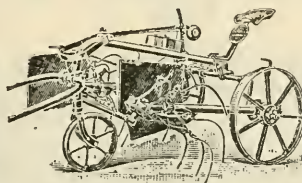
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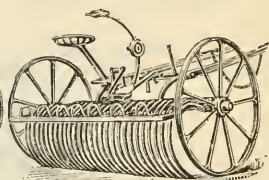
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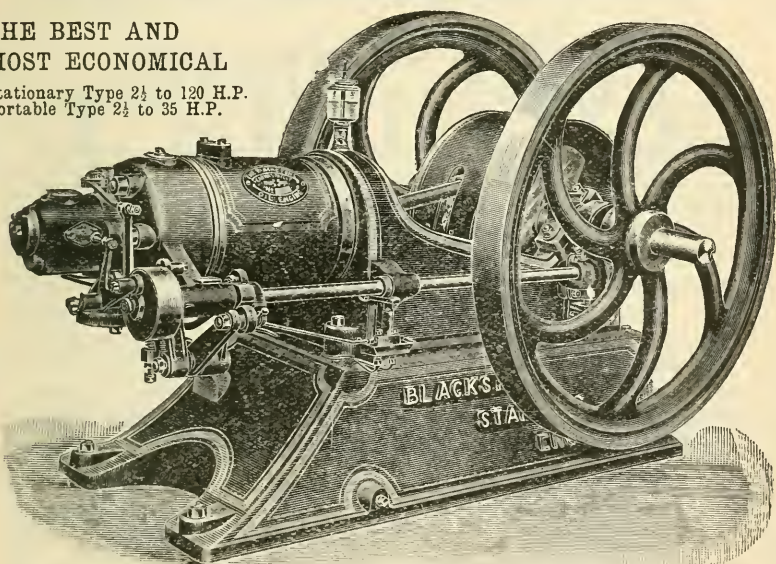
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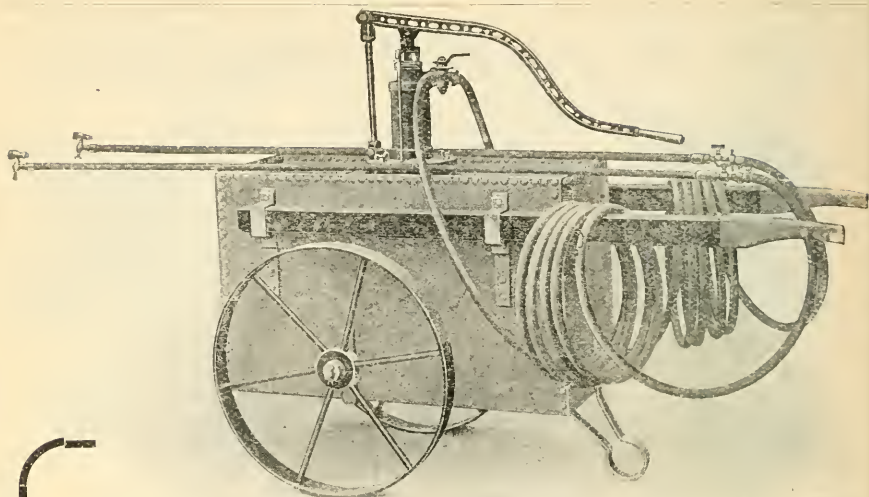


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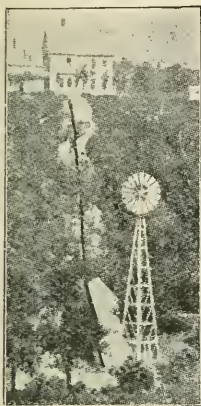
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Analytical Laboratory, 22, Tudor Street, New Bridge Street, London, E.C., June 5th, 1905.

Composition of a sample of Dried Grains sent by the English Grains Co., Ltd.

| | |
|---|-------|
| Moisture | 10.25 |
| Oil ... | 7.25 |
| *Albuminous Compounds (flesh-forming matters) ... | 19.25 |
| Digestible Carbohydrates, &c. ... | 42.72 |
| Woody Fibre (Cellulose) ... | 16.30 |
| †Mineral Matter (Ash) ... | 4.23 |

* Containing Nitrogen—3.08.

† Including Silica—1.69.

100.00

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GUARANTEED FROM EGYPTIAN SEED ONLY.

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MADE FROM FINEST QUALITY LINSEED. THOROUGHLY SCREENED.

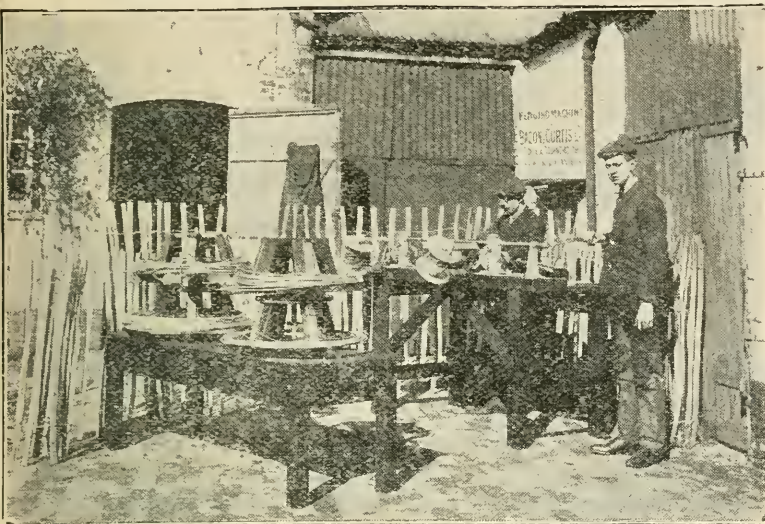


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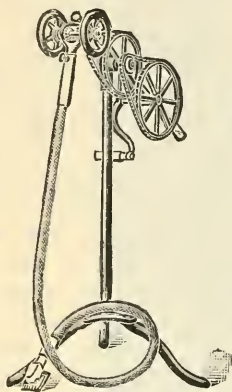
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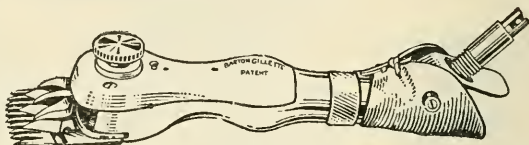


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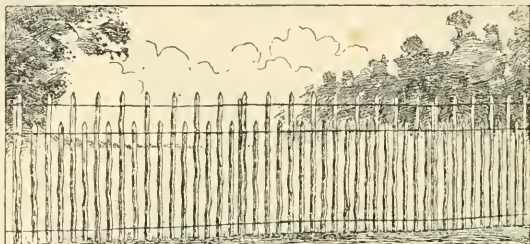
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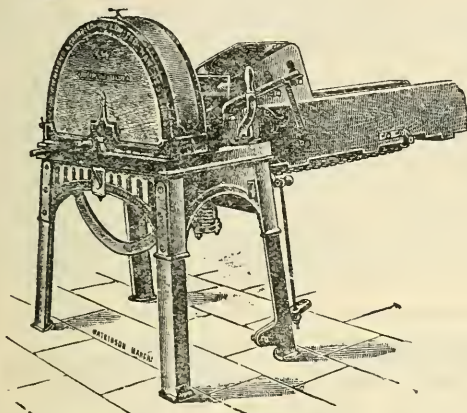
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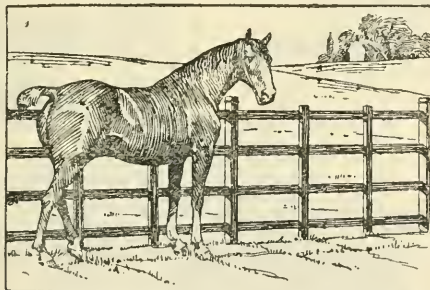
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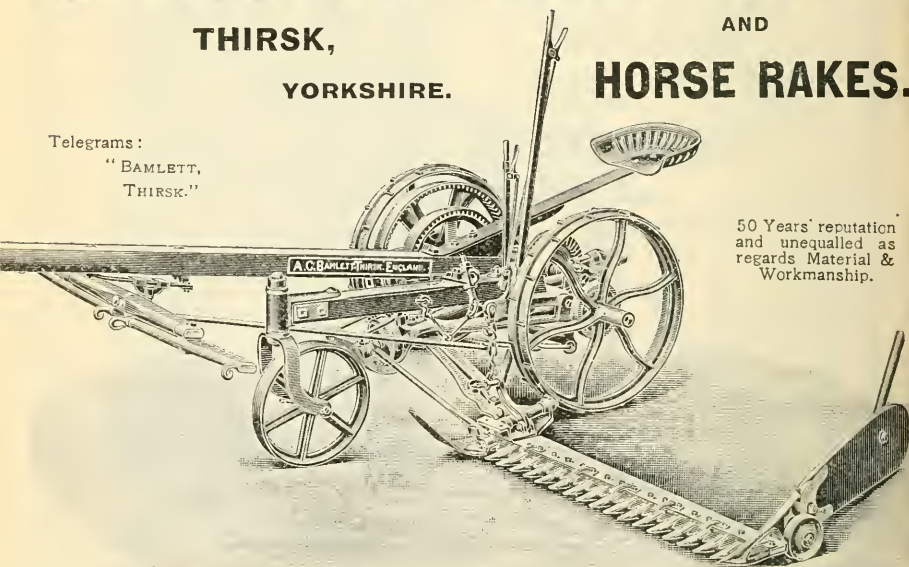
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| | |
|----------------------|----------------------|
| Tuesday, January 21 | Tuesday, June 10 |
| Tuesday, February 11 | Tuesday, June 17 |
| Tuesday, February 25 | Tuesday, June 24 |
| Tuesday, March 4 | Tuesday, July 1 |
| Tuesday, March 11 | Tuesday, July 8 |
| Tuesday, March 18 | Tuesday, July 15 |
| Tuesday, April 1 | Tuesday, July 22 |
| Tuesday, April 8 | Tuesday, July 29 |
| Tuesday, April 15 | Tuesday, October 14 |
| Tuesday, April 22 | Tuesday, October 21 |
| Tuesday, April 29 | Tuesday, October 28 |
| Tuesday, May 6 | Tuesday, November 4 |
| Tuesday, May 20 | Tuesday, November 11 |
| Tuesday, May 27 | Tuesday, November 18 |
| Tuesday, June 3 | Tuesday, December 2 |

By arrangement, Auctions in Town or Country can also be held on other days. Messrs. Debenham, Tewson, Richardson & Co. undertake Sales and Valuations for Probate and other Purposes of Furniture, Pictures, Farming Stock, Timber, etc.

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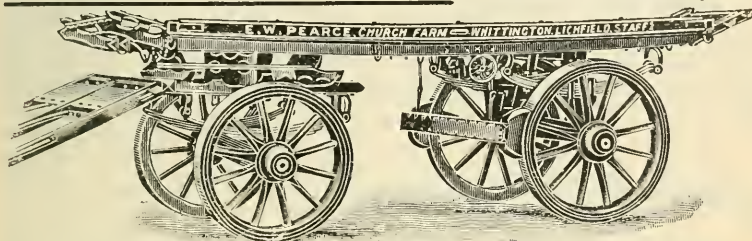


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
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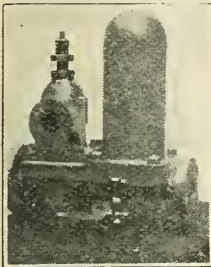
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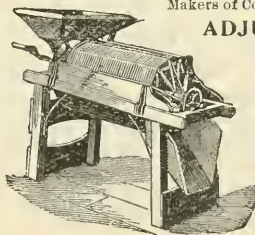
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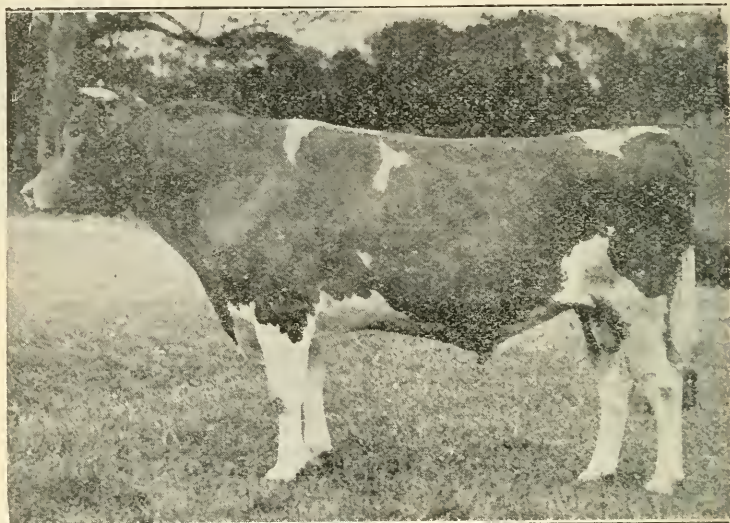
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BREEDERS' DIRECTORY.

HORSES—continued.

Various.

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CATTLE.

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CATTLE—continued.

Red Polled.

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BREEDERS' DIRECTORY.

CATTLE—continued.

Shorthorns.

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CATTLE—continued.

Shorthorns.

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CATTLE—continued.**Kerries and Dexters.**

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CATTLE—continued.**Various.**

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SHEEP—continued.

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SHEEP—continued.

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Various.

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PIGS.

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PIGS—continued.

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PIGS—continued.

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Various.

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BREEDERS' DIRECTORY.

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MISCELLANEOUS.

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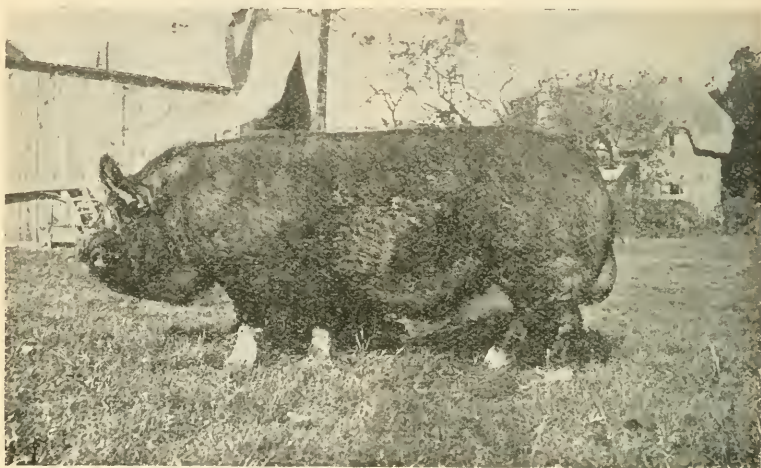
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MR. GEORGE HOYLES, SKIDBY MANOR, NEAR HULL.

THE STOWELL PARK JERSEY HERD

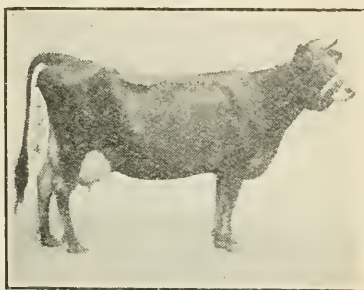
The Property of J. H. SMITH-BARRY, Esq., Stowell Park, Pewsey, Wilts.

GOLD MEDAL COWS IN THE HERD.



POST OBIT, born 1904, by Gay Boy 7510, dam Post Stamp 6th, by Distinction's Crown 4818.

Bred at Stowell, winner of 3 gold medals, 1st milking prizes (inc. R.A.S.E., 1911), silver medals and many inspection prizes.



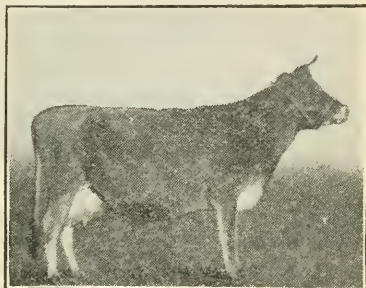
MARIGOLD, by Sportive (7037), d. Magenta 5th, by Dr. Jim (5261), born 1901.

Bred at Stowell, winner of 3 gold medals, 1st milking prizes, silver medals and C. inspection R.A.S.E.



CAPRICE, by Oxford Sunbeam (8650); d. Captious, by Geonnais Lad (6562), born 1905.

Bred at Stowell, winner of 4 gold medals, 1st milking prizes (inc. R.A.S.E., 1910), and silver medals, C. inspection R.A.S.E.




MALVOISIE, by Gay Boy (7510); d. Madeira 7th, by Reminders Invention (7643), born 1905.

Bred at Stowell, winner of 2 gold medals, milking prizes, and 2 silver medals, V.H.C. inspection, Tring.

PROMISE, by Oxford Sunbeam (8650); d. Post Obi by Gay Boy (7510), born 1906.



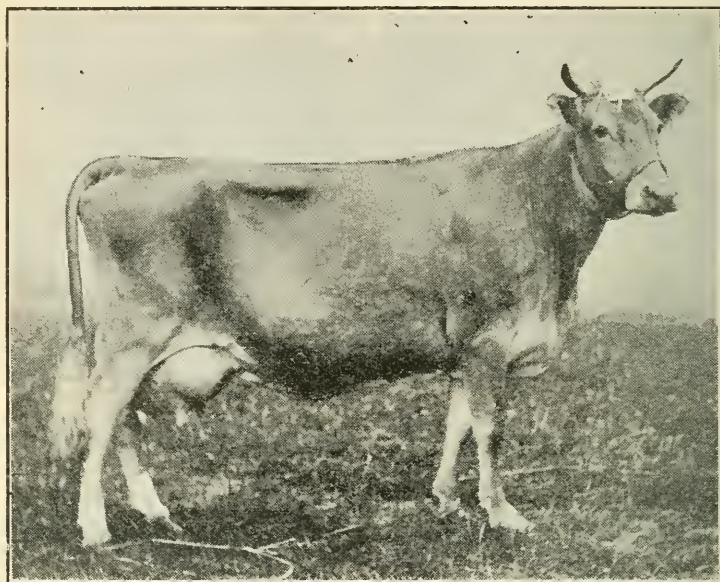
Bred at Stowell, winner of gold medal and 1st milking prize, dairy show, 1912, 42 lb. 1½ oz. milk, 2 lb. 12 oz. butter, 222 days after calving, C. inspection, R.A.S.E.

 **OFTEN YOUNG BULLS AND HEIFERS FOR SALE.**

THE HAYES GUERNSEY HERD.

THE PROPERTY OF

Sir EVERARD HAMBRO, K.C.V.O., Hayes Place, Kent,
and Milton Abbey, Dorset.



Guernsey Cow "HAYES OLIVE."

Photo by Parsons.

First Prize at the Bath and West, Royal Counties, London Dairy and Tunbridge Wells Shows, 1911. Champion at the Royal Counties Show, 1909 and 1910.

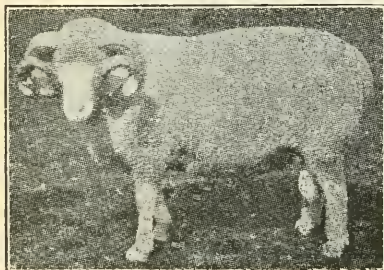
All the Animals of Both Herds have passed the Tuberculin Test.

Various Cows, Heifers and Bulls have been sold for export to the United States of America, Australia, New Zealand and the Argentine.

HEIFERS, COWS, AND BULLS NEARLY ALWAYS ON SALE.

The Herds can always be seen by appointment—

Mr. JONES, Hayes Place, Hayes, Kent, or Mr. WHITE, Milton Abbey, Blandford.



MILTON ABBEY, DORSET HORNED FLOCK.

Registered Flock Dorset Horns.

Prize Winners, Royal, Royal Counties, Bath and West, Somerset and other Shows, and a yearling ewe and ram of this flock took 1st prize and Grand Champion at World's Fair, St. Louis.

Telegrams:—YATES, Estate Office, Milton Abbas.

PEDIGREE DAIRY SHORTHORNS

Property of J. and H. ROBINSON,
IFORD, LEWES, SUSSEX, and LOWFIELD HEATH, HORLEY, SURREY.



JESSICA ELMSHURST,
Vol. 51., page 800.



WATERLOO ASTER,
Vol. 51., page 972. Gave 3,12½ gallons in three years.

MILK RECORDS KEPT.

These Herds include the favourite old Bates families, so noted for their dairy qualities—

OXFORDS, WATERLOOS, WILD EYES, CAMBRIDGE ROSES, BLANCHES, ACOMBS, FOGGATHORPES, BARRINGTONS, KIRKLEVINGTONS, DARLINGTONS, and others.

From the commencement these Herds have been bred on Dairy lines to fulfil several large milk contracts, at the same time great care has been taken to maintain constitution.

THE BULLS IN SERVICE include:

Ursula's Priceless Prince 107353, red. Sire, Babraham Proud Prince 97899, red. Dam, Amport Ursulina, red, who gave 9,836 lb. of milk from April 23rd, 1910, to February 25th, 1911, and won, in dairy classes, 1st Oxfordshire and 1st Royal Show, Lincoln, 1907; 1st Oxfordshire and 2nd Royal Show, Newcastle, 1908; 1st Somersetshire and 3rd Royal Show, Gloucester, 1909; 2nd Royal Show, Liverpool, and 1st Open and 1st Milking Trials at Somersetshire Show, 1910. Babraham Proud Prince's dam, Priceless Princess, gave 9,836 lb. of milk from June 30th, 1906, to March 6th, 1907, with her second calf, and won 1st Pedigree Dairy Shorthorn and 3rd Open Shorthorn Cow Class at Tring 1906, where she gave 59 lb. 14 oz. milk in twenty-four hours; also 3rd both Milking Trials and Butter Test at London Dairy Show, 1906, and 1st and Champion Dairy Shorthorn at Royal Show, 1907. Babraham Proud Prince's sire's dam, Prudish 9th, gave 9,050 lb. of milk in nine months.

Iford Waterloo Duke 102581, red. Sire Wild Prince 16th 93910, red. Dam, Waterloo Aster, red, who gave an average of 1,041 gallons of milk for three consecutive years. Her dam, Waterloo Rose, gave 1,034 gallons milk in 1903, and her granddam, Lady Somerset Waterloo, gave 1,002 gallons milk in 1902 and 1,074 gallons milk in 1903. Waterloo Aster is granddam of Waterloo Baroness, sold at the Cranford Sale, 1912, for 500 guineas. Wild Prince 16th, whose dam, Wild Erin, gave 987 gallons milk from September 15th, 1902, to July 30th, 1903, and won 1st Milking Trials London Dairy Show, 1902, was sire of six cows sold in the Cranford Sale, 1912, for an average of 146½ guineas, and who had given an average of 957½ gallons of milk each for the previous year; he was also sire of six cows sold in the Cranford Sale, 1911, who had given an average of 1,030 gallons of milk each per year.

Rupert 100506, red. Sire, Conjurer 91310. Dam, Red Rose 3rd, red, who gave 11,744 lb. of milk year ending September 30th, 1908, and who won 1st Yorkshire and 3rd Inspection and reserve Milking Trials, London Dairy Show, 1906; 1st Inspection and v.h.c. Milking Trials, London Dairy Show, 1907, and 1st Yorkshire and 3rd Inspection and h.c. Milking Trials, London Dairy Show, 1908; two 1sts Peterborough, 1909. Conjurer's dam, Darlington Cranford 5th, holds by far the best milking records of any Pedigree Shorthorn, having given 12,567 lb. of milk year ending September 30th, 1908, and an average of 1,000 gallons for ten consecutive years; she is winner of a large number of prizes, including many Milking Trials and Butter Tests. Conjurer's sire's dam, Lady York Bates 20th, gave over 1,200 gallons of milk within the year.

Wild Eyes Duke 107516, roan. Sire, Rowbury 75491. Dam, Wild Eyebright, roan, who gave 11,923 lb. of milk year ending September 30th, 1910, and an average of 983 gallons for seven consecutive years, and is own sister to Wild Erin, winner of 1st Milking Trials, London Dairy Show, 1902. Rowbury was reserve in a strong class at Birmingham, 1898, and 1st Sussex County Show, 1901; his dam, Datura 8th, red, was an exceedingly fine Dairy Cow who gave over six gallons of milk per day after calving. Rowbury was sire of Melody 12th, winner of 1st Inspection Heifer Class London Dairy Show, 1911, and 1st Inspection Class London Dairy Show, 1912.

Baron Oxford 107794, red, little white. Sire, Waterloo King 97828. Dam, Oxford Belle, who gave 1,027 gallons of milk in year ending September 30th, 1908; she was dam of Oxford Record, sold as yearling for 400 guineas, and Oxford Belle 6th, sold at ½ months for 200 guineas. Waterloo King's dam, Waterloo Rose 2nd, gave 1,184 gallons of milk in 1905, and won 2nd Inspection Class at Tring, 1906.

BULL CALVES FOR SALE whose Sires and Dams have both been carefully bred from heavy milking cows with good udders.

All Calves reared are numbered with earmarks at birth, and all Cows are numbered on horn.

IFORD HERD OF PEDIGREE LARGE BLACK PIGS.

Numbers have been sent to Colonies and other countries, where they have given greatest satisfaction. Pigs not exhibited, but many winners have been bred from this Herd, including Champions at the Royal.

A Registered Flock of 1,000 SOUTHDOWN SHEEP is kept at Iford in natural breeding condition on the Downs.

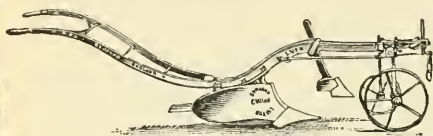
Inspection invited. Telephone: 114 Lewes. Trains met by appointment. Lewes 50 miles from London, Horley 25 miles from London, both on main line.

J. & F. HOWARD, BEDFORD.



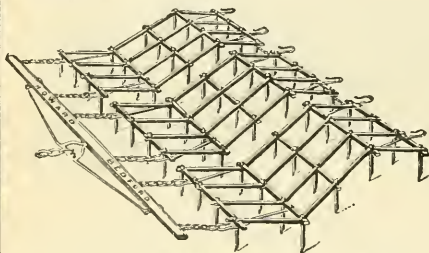
CHAMPION PLOUGHS.

| | £ | s. | d. |
|---|---|----|----|
| S B, a very light pair-horse plough, weight 229 lbs. | 4 | 17 | 6 |
| J A, the famous Champion, weight 266 lbs. | 5 | 5 | 0 |
| B, a pair-horse general purpose plough, weight 283 lbs. | 6 | 2 | 6 |
| Skim Coulter, 5s. 6d. extra. | | | |
| Steel instead of iron breast, 3s. extra. | | | |



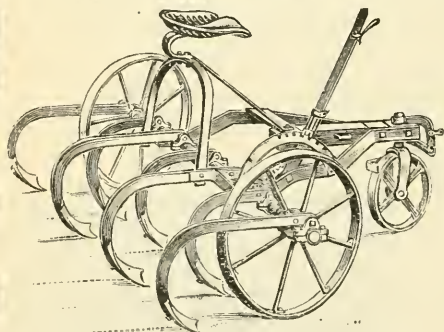
DIGGING PLOUGHS.

| | | | |
|--|---|----|---|
| DDX, with two wheels, and skim coulter, weight 206 lbs. | 4 | 10 | 0 |
| LBX, with two wheels, and skim coulter, weight 236 lbs. | 5 | 5 | 0 |
| LBFN, with two wheels, and skim coulter, weight 236 lbs. | 5 | 5 | 0 |
| LB T, with steel chisel bar share, weight 236 lbs. | 5 | 5 | 0 |



ORIGINAL HARROWS.

| | | | |
|--|---|----|---|
| No. 14, for one or two horses, 8½ ft. wide, weight 145 lbs. | 3 | 7 | 6 |
| No. 12, for two horses, 9½ ft. wide, weight 190 lbs. | 3 | 15 | 0 |
| No. 11, for two or three horses 10 ft. wide, weight 245 lbs. | 4 | 5 | 0 |



FAMOUS CULTIVATORS.

| | | | |
|--|---|---|---|
| No. 5, with seven tines, working width 4½ ft., weight 336 lbs. | 8 | 0 | 0 |
| Seed-box attached for broadcast sowing, Four Guineas. | | | |
| No. 7, with nine tines, working width 5½ ft., weight 366 lbs. | 9 | 5 | 0 |
| Seed-box attached for broadcast sowing, Five Guineas. | | | |

**FIFTY SEVEN FIRST PRIZES
AS WELL AS GOLD AND SILVER MEDALS
HAVE BEEN AWARDED TO J. & F. HOWARD
BY THE ROYAL AGRICULTURAL SOCIETY OF ENGLAND.**

NEW BRUNSWICK

(CANADA).

THE PROVINCE which you should **NOT** fail to **INVESTIGATE.**

If you are thinking of selling your Estate or Farm, or have surplus capital to invest, there are no more **promising investments** than New Brunswick offers. Farms can be purchased at prices varying from £1 to £10 per acre at which an **increase in Capital Value** is positive. **All farms** we offer have good Residences and necessary Outbuildings. Produce prices are

AS GOOD IN NEW BRUNSWICK AS AT HOME,

and the soil is quite as productive ; with markets that are never fully supplied.

Lands are rapidly increasing in value, owing to the **great developments** that are taking place throughout the Province. £20,000,000 are being spent on Public Works and Private Enterprises.

New **Bridges** and **Railroads** are being constructed ; huge **Docks** building at St. John, N.B. (the Liverpool of Canada) ; large **Foundries, Factories, and Warehouses** erected, and gigantic **Water-Powers** harnessed, all tending to the rapid increase in land values in New Brunswick.

We have some of the best
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and other
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On receipt of enquiry, we shall be pleased to send full particulars of Properties, and Literature on the Province.

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Pupils trained in ENGLAND and on our Farms in NEW BRUNSWICK.

PROTECT CORNFIELDS

**BARLEY, WHEAT, PEAS,
OATS, BEANS, MAIZE, TARES**

from

BIRDS

PREMATURE GROUND ROT and SMUT

By Using

Corvusine D.G.

The wonderful non-poisonous liquid seed dressing.

NO TROUBLE FROM

**ROOKS, WOODPIGEONS, PHEASANTS,
and other birds.**

CAREFUL MEN READ THIS.

Thousands of Farmers, including the Principal Estates in the Country and the Royal Farms, annually use and recognise the incomparable value of Corvusine. Ask for and be sure you get CORVUSINE D.G., the original liquid Seed Dressing, which is prepared by an exclusive process to produce the highest percentage of germination and will not injure the Seed. Refuse worthless imitations if you value your crops.

| Size. | Containing | Wheat, Peas, Beans, Vetches, Maize, Buckwheat. | Barley, Rye, &c. | Oats, &c. | Net Price. | Carriage extra from Manufacturer. |
|-------|-----------------|--|---------------------|-----------|------------|---|
| | Galls. | Bushels. | Bushels. | Bushels. | £ s. d. | |
| No. 1 | $\frac{1}{2}$ | 16 | 14 | 12 | 0 4 6 | 8d. |
| No. 2 | 1 $\frac{1}{4}$ | 40 | 35 | 30 | 0 10 6 | Free. |
| No. 3 | 2 $\frac{1}{2}$ | 80 | 70 | 60 | 1 0 0 | " |
| No. 4 | 6 $\frac{1}{4}$ | 200 | 175 | 150 | 2 5 0 | " |

**Stocked by Corn-Seedsman, Chemists and Ironmongers everywhere,
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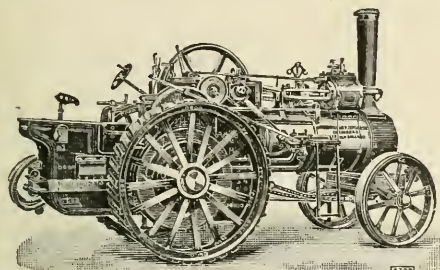
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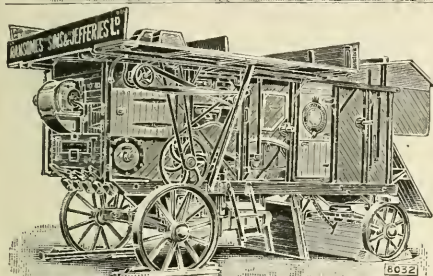
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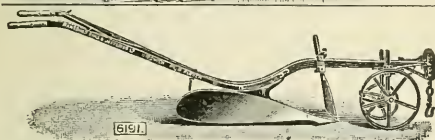
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AND
STACKERS.



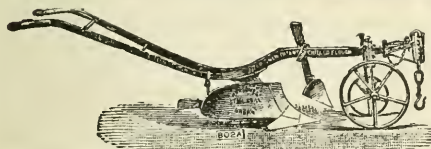
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FOR ALL PURPOSES
AND SOILS.



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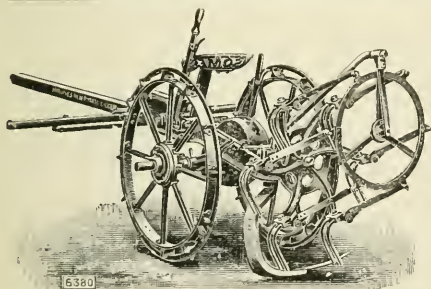
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IN ALL SIZES
To suit every requirement.



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*Guaranteed to give a Clean Delivery
without Bruising the Potatoes.*



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"Manual" and
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